

# THE AMERICAN PSYCHOLOGIST

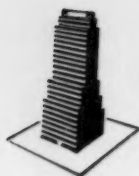
VOLUME 9



NUMBER 8

August, 1954

THE AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.



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# THE AMERICAN PSYCHOLOGIST

The Professional Journal of the American Psychological Association, Inc.

Volume 9

August, 1954

Number 8

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THE AMERICAN PSYCHOLOGIST is published monthly by the American Psychological Association, Inc., at Prince and Lemon Streets, Lancaster, Pennsylvania. Subscription: \$8.00, single copy \$1.00. Communications on business matters should be addressed to Publishers, The American Psychologist, Prince and Lemon Streets, Lancaster, Pennsylvania, or the American Psychological Association, Inc., 1333 Sixteenth St. N.W., Washington 6, D. C. Address communications on editorial matters and advertising to 1333 Sixteenth St. N.W., Washington 6, D. C.

Entered as second-class matter January 12, 1950 at the Post Office at Lancaster, Pa., under the Act of March 3rd, 1879. Acceptance for mailing at special rate of postage provided for in paragraph (d-2), section 34.40, P. L. and R. of 1948, authorized August 6, 1947.

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# PROGRAM OF THE SIXTY-SECOND ANNUAL CONVENTION OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

## ABSTRACTS OF PAPERS<sup>1</sup>

**Abelson, Robert P.** (*Yale University*) **A technique and a model for multidimensional attitude scaling.**

A scaling procedure is described which can produce multidimensional attitude "maps" for either a single subject or for groups of subjects. The method requires that each subject judge the similarity of the members of pairs of attitude statements. The maps are computed from these judgments by a procedure analogous to factor analysis.

The attitude maps are interpretable by representing "psychological distance" (in terms of which the judgments are made) by physical distance (on the map). The attitude "space" can be thought of as a frame of reference in which various attitudes are located according to their meaningful connections with one another. High similarity or meaningful connection can be represented by small physical distance and high dissimilarity by large physical distance.

The technique was applied to 114 Ss. Twelve statements dealing with war, armaments, and Communism were employed. Consistent differences were found between the attitude map of a group of Ss from the Young People's Socialist League and the maps of two groups of politically conservative Ss. Interesting insights into Ss' attitudes are provided by examination of the internal inconsistencies of each map and also by postulating a kind of Lewinian force field in which the various statements exert attractive and repulsive forces throughout the space.

The technique was seen to yield somewhat different results than a standard factor analysis, because of the more projective nature of the judgments required of Ss.

The study was done as part of a coordinated research project conducted by the Yale Communication Research Project. (Slides)

<sup>1</sup> The abstracts are arranged alphabetically according to authors' names. For all details concerning time and place of meetings and presentation of papers, see the *July American Psychologist*.

**Adams, John D.** (*House of Correction, Jessups, Maryland*) **A multidimensional approach to the study of lawbreaking.**

Consistent with the multidisciplinary approach to scientific research, a study was made of 515 admissions to a penal institution, in terms of an array of six psychological and sociological dimensions. The purpose was to develop a frame of reference in terms of gross deviations in behavior or constitution, which would be serviceable in further studying adjustability. The criterion of adjustability was not an ethical one, but an empirical one in that the person's conduct had become an issue with the community and resulted in his conviction at law and incarceration.

The principal dimensions selected were: (a) deviations in terms of social conduct norms; (b) individual development abnormalities; (c) psychosocial imbalances; (d) gross mental illness, short of psychosis; (e) mental disorder (psychosis); (f) external agents involved (alcohol, narcotics). Under these six headings, 17 specific conditions were identified as follows: accidental lawbreaking; character deficits; cultural differences; mental deficiency; emotional immaturity; organic conditions; regressed, senile and deteriorated; neurotic deviate; psychopathic deviate; psychoneurosis; psychopathic personality; schizoid personality; paranoid personality; depressed; schizophrenia and other psychoses; alcohol; narcotics.

Statistical criteria were not applied, but a test sample by two psychologists showed reasonable agreement both on identifying the presence of the deviation and agreement as to what was beyond "normal range." Objective measures were possible in some dimensions, for example, mental deficiency. Some of the measures were quite subjective, for example, character deficits. Some of the measures could be inferred reliably from social history, for example, admission to a mental hospital.

Even though syndromes selected interact within the individual to make up the total resultant behavior, they are nevertheless relatively independent biologi-



cal, psychological, and sociological processes, and hence should have predictive value.

**Aikman, Louis** *see* Tuckman, Jacob

**Alexander, Lawrence T.** *see* Lincoln, Robert S.

**Allison, Roger B., Jr.** (*Educational Testing Service*) **Learning scores as predictors.**

**PROBLEM:** To develop a learning measure for use in predicting performance in Navy training schools teaching mechanical-motor skills, and to determine the extent to which such measures would increase the predictive effectiveness of the Navy's Basic Battery.

**SUBJECTS:** 276 entering students from six consecutive classes in a Torpedoman's Mates School.

**PROCEDURES:** The experimental design was to create in miniature a training situation similar to that found in a Torpedoman's Mates School. Based upon a performance test, learning scores were developed which reflected a student's ability to learn the assembly operations of the breechblock of a 40-mm. antiaircraft gun when given instructions by sound film. The training material was a section of a film previously developed for Special Devices Center of ONR by Pennsylvania State College. The procedure was to show the film, and then to allow the Ss 3 min. to assemble as much of the gear as possible. The film-assembly sequence was repeated for a total of five cycles. Each time a proctor rated S's performance using a specially prepared objective record sheet.

**RESULTS:** Several types of learning scores were derived from the raw scores (number of steps completed correctly and the amount of time consumed per trial) and were correlated with school grades and other scores obtained from the Basic Battery. The validities of the various learning scores will be presented and discussed.

**CONCLUSIONS:** In general, the learning measures correlated with grades about as high as tests from the Basic Battery. For students entering the school directly from Recruit Training Centers, a cumulative rate-of-work index correlated .34 with both performance ratings and final grades in the school, and increased the multiple correlation between the Basic Battery and final grades from .55 to .62. The study clearly indicates the potentiality for using learning measures of this type as predictors of future success.

This study was conducted under joint sponsorship of Bureau of Naval Personnel and Office of Naval Research.

**Altman, Irwin** *see* McGinnies, Elliott

**Altshuler, Ira M.** (*Group-Music Therapy Department, Wayne County General Hospital, Eloise, Michigan*) **The id-ego-superego and the aesthetical factor in music therapy.** (Sponsor, Melvin G. Rigg)

Music is a compound. Its general configuration is made up of structural elements such as rhythm, melody, harmony, tone color, etc. It possesses a unique quality in that it at once has access to the three mental strata—id, ego, and superego. Experience and clinical observations point to the assumption that certain structural elements of music show predilection to given mental strata. Thus, rhythm gravitates to the id; melody to the superego; while harmony has an affinity for the ego.

Other structural elements of music such as loudness, pitch, and volume behave in a similar way.

There is further evidence that not only do certain structural music elements relate to certain mind strata, but there is no interference; that is, each stratum receives what it needs. Whereas in the case of an idea or thought, for instance, the ego may find itself censored by the superego and even develop guilt feeling, the action of music causes no such conflicts, since the superego is not clearly and acutely aware of whatever transgression.

For example, in schizophrenia when the id is in complete or partial control of the mind and the spoken word has no access, music rhythm, which has a strong affinity for the id, is the only means of contact between the patient and the outer world.

Our theory is that the therapeutic value of music esthetics resides in its singular capacity to unite and achieve maximum pleasure of the three strata—id, ego, superego, never in accord, this without damage to any stratum. (Records)

**Ammons, C. H.** *see* Ammons, R. B., Neumann, E.

**Ammons, R. B., & Ammons, C. H.** (*University of Louisville*) **Transfer of motor skill and decremental factors along a speed dimension.**

**PROBLEM:** To investigate transfer of proficiency, work decrement, and warm-up decrement from one speed of rotary pursuit to another.

**SUBJECTS:** 960 boys and girls from grades 10, 11, and 12; 20 in each of 48 groups.

**PROCEDURE:** Ss were given two periods of practice: Period 1 of 5 min. and Period 2 of 8 min. During Period 1, practice was at 40, 50, 60, or 70 rpm, while during Period 2 one-fourth of the Ss in each Period 1 speed group practiced at each of the 4 speeds. Each of the resulting 16 groups was divided into 3 distribution-of-practice groups of 20 Ss each: (a) practice in cycles of 1-min. work, 2-min. rest; (b) con-

tinuous practice during periods with 30-sec. rest between them; (c) continuous practice during periods with 10-min. rests between them.

RESULTS: (a) Prerest speed groups showed increasing positive transfer of proficiency in the following order: 70, 60, 40, 50. (b) Factors producing warm-up decrement transferred from speed to speed, with more transfer from medium speeds and to lower speeds. (c) Temporary work decrement shows complete transfer on the average from one speed to another. CONCLUSIONS: (a) Several different factors probably determine proficiency and affect its transfer. (b) Warm-up decrement is affected by both original practice speed and test speed. (c) Temporary work decrement may well be independent of changes in speeds. (d) Interpretations are completely dependent upon measuring scale used, and simple time on target may well not be the most adequate scale.

Ammons, R. B. *see* Neumann, E.

**Andreas, Burton G. (University of Rochester)**  
**Motor conflict as a function of amount of training and level of motivation.**

PROBLEM: To determine the amount of motor conflict generated by competing response tendencies of approximately equal strength when these arise from four amounts of training and two levels of motivation. SUBJECTS: 192 undergraduates assigned to 8 groups. PROCEDURE: Ss were trained in moving a handle to either one of a pair of spatially separated stimuli that were presented on a particular trial. During training either one of two negative stimuli was paired an equal number of times with each of the four positive stimuli. Through trial-and-error learning Ss gradually acquired tendencies to avoid the negative stimulus and move to the positive one. The strength of these avoidance tendencies was a function of the number of training trials, 8, 16, 24, or 40. After training, a conflict trial was given in which the two negative stimuli were presented together. The amount of blocking was noted and response time was measured.

The study of conflict as a function of 4 amounts of training was replicated at 2 levels of motivation. These motivational levels were achieved by using two different intensities of electric shock as punishment for responses to the negative stimuli.

RESULTS AND CONCLUSIONS: 1. The amount of blocking observed was much less than has been found in previous experiments on motor conflict. It is suggested that differences in the instructions and procedure account for this finding.

2. Response time—considered an index of conflict—was found to be an increasing function of both amount of training and level of motivation. (Slides)

Andreas, Burton G. *see* Gerall, A. A.

**Andrews, T. G., & Muldoon, John F. (University of Maryland)**  
**Factorial study of Schlosberg's analysis of facial expressions.**

The problem was to determine by multidimensional psychophysics the dimensions of discrimination for a series of facial expressions of emotion. Schlosberg's recent studies of facial expression produced certain definite conclusions regarding the dimensions of such expressions. Recently there have been developed factorial techniques in multidimensional psychophysics as methods for studying perception. Because of the possible relations between Schlosberg's experimental analysis and the psychophysical analysis obtainable by factorial methods, the same stimuli used by Schlosberg were presented to Ss in a new manner and the data were treated by the new method.

Sixteen of the Frois-Wittman pictures of facial expression were selected to correspond to various locations on the two general dimensions determined by Schlosberg in his experimental studies. Twelve of these pictures involved only one dimension, three involved two dimensions, and one was neutral according to Schlosberg's findings. These 16 pictures were presented to 30 Ss in a system of nonserial matching for judgments of maximum similarity. This procedure was in accordance with Case III of the A technique of multidimensional psychophysics, which is described elsewhere.

The results of the judgments of similarity produced a matrix of proportions which was transformed into a correlation matrix. The correlation matrix was factor analyzed to eight factors. These factors were rotated by the single-plane method, using Schlosberg's reference pictures as criteria, i.e., as trial reference vectors. There was duplication of Schlosberg's dimensions, and this result was taken to indicate importance and usefulness for the A technique in experimental work. Also the unique qualities of the single-plane rotation method are demonstrated when experimental criteria are available.

**Anger, Douglas. (Harvard University)**  
**The dependence of responding upon the relative frequency of reinforcements following different interresponse times.**

The purpose of this study was to determine whether rats reinforced on a variable interval schedule are influenced by the relative frequency of reinforcements following different interresponse times.

After stabilization on a variable interval schedule, four rats were reinforced only following interresponse times longer than 40 sec. The frequency of interresponse times around 40 sec. increased, while shorter interresponse times decreased greatly. Thus, under

some conditions rats can adjust their interresponse times toward those values that receive more reinforcements. Since the distribution of reinforcements which produced the adjustment was radically different from that of a variable interval schedule, this experiment did not demonstrate that such adjustment occurs with variable interval schedules.

To determine whether such adjustment occurs during variable interval reinforcement, the reinforcements following different groups of interresponse times up to 28 sec. were separately controlled. Rats were changed from a variable interval schedule to this separate control with the reinforcement rates for each group adjusted to the same values that prevailed before changing. There resulted little or no change in interresponse time frequencies, indicating that this control was substantially equivalent to a variable interval schedule. Then shift of a moderate number of reinforcements from one group of interresponse times to another produced a decrease in the frequency of the interresponse times that lost reinforcements and an increase in the interresponse times that gained reinforcements. Only 10 of the total 45 reinforcements per hour were shifted, so conditions were not changed greatly from those prevailing under the variable interval schedule. Hence it is concluded that with some variable interval schedules the distribution of interresponse times is determined in part by the reinforcements allotted to the different interresponse times.

This research was partly supported by the Office of the Surgeon General, Contract DA-49-007-MD-408. (Slides)

**Angoff, William H.** (*Educational Testing Service*)  
The "equating" of nonparallel tests.

The present paper attempts to outline the reasons that conversion tables which purport to give "equivalent" scores on tests that measure different psychological functions—such as the College Board Scholastic Aptitude Test (SAT) and the American Council on Education Psychological Examination (ACE)—cannot have generality of meaning and application.

In the present context it is helpful to draw the distinction between parallel and nonparallel measures. In the case of parallel measures, the conversion problem is simply one involving the transformation of unit systems, as in the case of inches to centimeters, grams to pounds, etc. The errors attendant on such conversions lie in the unreliability of the measuring instruments, the choice of samples used to establish the conversion lines, and in the statistical design of the equating experiments. In this type of problem it is reasonable to hypothesize a unique "true" line, with replicated lines differing randomly from it. However, in the case of nonparallel measures such as the SAT

and the ACE, a number of logical and practical difficulties exist. The errors associated with such conversion systems include those associated with parallel measures, and also include other, nonrandom errors. Here there is no unique line. Conversion systems will be systematically different depending on: (a) the methodological definitions of "equivalence," (b) the types of groups chosen for the "equating" experiments, and (c) the types of selection operating on the groups chosen. Finally, there are dangers of interpretation, since converted scores are often erroneously presumed to inherit the discriminative characteristics of the test to which they are converted, whereas they actually possess the characteristics of the original test, and differ from it only in the manner in which the scale is expressed.

Data are presented in support of the foregoing thesis, and describe the results of score transformation in the case of nonparallel tests, where different types of groups are used. The nonuniqueness of such conversion lines is thus illustrated for the case of the SAT and the ACE.

**Antinoph, Edwin L., Gurvitz, Milton S., & Aronson, Cecily P.** (*Hillside Hospital*) The normal process of maturation and aging. (Sponsor, M. S. Gurvitz)

**PROBLEM:** What changes occur, between ages 20–54, in intellectual functioning and personality structure, during normal maturation?

What relationship do the experimental findings have to previous research?

**SUBJECTS:** Rorschach: 450 cases, ages 20–54; intelligence range Inferior–Very Superior. Wechsler-Bellevue: 746 cases, ages 20–54; from standardizing population. USPHS Classification Test: 4,346 white male prisoners; Revised Alpha: 1,713 white male prisoners; Revised Beta: 1,063 white male prisoners, ages 20–54 equated for education and/or socioeconomic status with the general population.

**PROCEDURE:** With the use of verbal, performance, group, and individual tests, relationship to age was established for general intelligence, verbal and performance levels, and the various intellectual and personality factors of the Rorschach. The effect of educational level was partialled out. Generalized curves of decline were established with speed and quality as separate factors. The literature was then evaluated to determine the results of more piecemeal studies. Chi square was used to test differences.

**RESULTS:** Intellectual and personality factors change with maturation relative to intellectual and educational levels. If speed is held constant, verbal and performance abilities decline at an equal rate. Lower education accounts for one-half of the rate of decline



with age. Rorschach personality factors reveal greatest maturity and integration at 20-24 with various alterations occurring at different age, intellectual, and educational levels. These were compared with the investigations in the literature.

**CONCLUSIONS:** The aging process causes decline in intellectual functioning and alteration of personality factors related to the predecline level of intelligence and personality integration.

Present literature has not evaluated its findings in terms of group differences.

Planning for social action must consider two factors: (a) Aging process begins at end of second decade. (b) The decline rate varies according to the intellectual group to which individuals belong.

**Armington, John C., & Crampton, George H.**  
(*Army Medical Service Graduate School*)  
**The area-intensity relation and retinal location in the human electroretinogram.**

**PROBLEM:** Previous study of the photopic components of the human electroretinogram (ERG) has shown that retinal stimulus area is a more potent variable than intensity in eliciting responses of fixed magnitude. It has not been certain, however, whether or not this result was produced by differences in electrical sensitivity of various retinal regions. Results from some laboratories have suggested that the periphery is more sensitive than the fovea, while others have found an opposite relationship. In the present investigation the sensitivity of the retina has been mapped and compared with area-intensity data obtained under similar stimulus conditions.

**SUBJECTS:** 3 Ss with normal vision were used.

**PROCEDURE:** Conventional recording apparatus together with a contact lens electrode were used to record the photopic components of the ERG. Since preliminary work indicated that the reference electrode should be as far from the eye as possible, it was moved from the customary forehead position to the chin. The experiment was divided into three parts: (a) To obtain new area-intensity data, the retina was stimulated with disks of different diameters placed symmetrically about the fovea. (b) The retina was stimulated with rings and other geometric patterns also symmetric with the fovea. (c) Detailed study was made of the sensitivity of the ERG along a horizontal meridian extending 40° on either side of the fovea.

**RESULTS:** Although area-intensity data again revealed area to be a more effective variable than intensity, the data suggest that this result is governed largely by the area of the stimulus alone rather than by the locus of the stimulus on the retina. Not only did geometric figures of different forms but of equal areas give responses of similar magnitude, but sensitivity was

found to be very closely the same at all retinal positions investigated. (Slides)

**Armour, Jerrold B.** *see* Smith, Henry Clay

**Aronson, Cecily P.** *see* Antinoph, Edwin L.

**Aschner, Bertha** *see* Kallmann, Franz J.

**Attneave, Fred.** (*AF Personnel and Training Research Center*) **Immediate memory for symmetrical patterns with controlled informational content.**

**PROBLEM:** Gestalt psychologists have maintained that "good" figures (simple, compact, symmetrical, etc.) are remembered better than "poor" ones. It has recently been pointed out by Hochberg and McAlister and by Attneave that "figural goodness" is equivalent to redundancy in visual stimulation, and accordingly quantifiable in informational terms. For example, a symmetrical pattern that is constructed by juxtaposing a random pattern with its mirror image obviously contains only the information contained in the original random pattern. The study to be reported investigates the hypothesis that symmetrical patterns are no easier to remember than random ones unless the symmetrical patterns contain less information.

**SUBJECTS:** 149 airmen basic trainees.

**PROCEDURE:** S's task was the immediate reproduction, after 1-sec. exposure, of each of a set of 50 patterns formed by dots in a matrix. Five different sets of patterns were reproduced, by separate groups. Sets of symmetrical 20-cell and 35-cell patterns contained the same information (12 bits per pattern) as a random 12-cell set. Two additional random sets were equivalent in number of cells to the symmetrical sets. The 5 sets had 12 cells in common: comparable error scores were obtained by scoring only these corresponding cells.

**RESULTS:** The symmetrical patterns were not easier to reproduce than random patterns of equivalent informational content; on the contrary, they were much more difficult. Symmetrical patterns did show a significant but relatively small advantage over random patterns equivalent in number of cells. These results are consistent with the hypothesis tested, and with the further view that the information contained in symmetrical patterns is "encoded" in a fairly inefficient manner by human observers. (Slides)

**Auld, Frank, Jr., & Eron, Leonard D.** (*Yale University*) **Application of Guttman's scaling method to the TAT.**

Social scientists interested in attitude measurement have developed elegant methods for constructing scales. The authors wished to test whether or not such methods could be applied to projective tests.

The Ss were 100 sailors at the submarine school, U. S. Naval Submarine Base, New London, Connecticut.

The Navy Group TAT was administered to Ss. Their stories were scored according to the drives believed to be indicated in the stories. Reliability of scoring was studied, and correlations between scores on various pictures were computed.

Results are presented for "sex" scores on four pictures. The product-moment correlation between scorings done by two psychologists was .89. A study of the patterning of responses showed that the four pictures meet Guttman's criteria for a scale. The coefficient of reproducibility is .93; the coefficient of scalability (computed as suggested by Menzel) is .73. A factor analysis showed that the scores are determined by two factors: strength of sexual fantasy and level of interpretation (i.e., strength of tendency to tell imaginative stories).

We conclude that methods of scaling used in attitude studies can be successfully applied to projective techniques. (Slides)

Austin, George A. *see* O'Dowd, Donald D.

Ausubel, D. P., Balthazar, E. E., Berkovitz, I. R., Blackman, L. S., Clifford, E., Schpoont, S. H., & Welkowitz, J. (*University of Illinois*) Perceived parent attitudes as determinants of children's ego structure.

**PROBLEM:** To determine relationships between perceived parent attitudes of acceptance-rejection and intrinsic-extrinsic valuation and various components of children's ego structure.

**HYPOTHESIS:** Rejected and extrinsically valued children manifest unrealistically high and tenacious goals, high prestige needs, notions of omnipotence, more mature patterns of goal striving, and greater ideational independence.

**SUBJECTS:** 40 fourth and fifth grade children.

**MEASURING INSTRUMENTS** (reliability coefficients shown in parentheses): Children rated 36 parent-attitude items reflecting acceptance-rejection and intrinsic-extrinsic valuation along a scale of perceived correspondence with own parents' attitudes (.75). Reality and tenacity of goals were measured by goal-discrepancy (.90) and goal-tenacity (.82) scores on four laboratory tasks and on a bogus score stylus-maze task (.97). Notions of omnipotence were elicited by a scale tapping perceived ability to perform relatively improbable and impossible feats (.92). A difference score between competitive and ostensibly anonymous work measured responsiveness to prestige incentives (.82). Expressed divergence from 41 per-

ceived parent opinions measured ideational independence (.67). Executive independence and ability to postpone immediate hedonistic gratification were measured by successive instructor's ratings in crafts activities (.91, .88).

**RESULTS:** Perceptions of acceptance and intrinsic valuation were highly correlated. Girls perceived themselves as significantly more accepted and intrinsically valued than did boys. The self-perceived extrinsically valued children manifested more stylus-maze goal tenacity and notions of omnipotence, disagreed more with perceived parent opinions, and were rated as more able to postpone hedonistic gratification and as more executively independent. Goal-discrepancy scores, responsiveness to prestige incentives, and perceived omnipotence were positively correlated with goal-tenacity scores.

**CONCLUSION:** Partial confirmation of hypothesis. Individual differences in preadolescents' ego structure may be partly obscured by normative commonalities referable to dependent biosocial status.

Ax, Albert F., Fordyce, William, Loovas, Ivar, Meredith, William, Pirojnikoff, Leo, Shmavonian, Barry, & Wendahl, Ronald. (*University of Washington School of Medicine*) Quantitative effects of sleep deprivation.

The hypothesis is tested that the human psychophysiology compensates for the fatigue of sleep deprivation by increased effort or efficiency and that the degree of compensation is a function of the motivation during performance.

**METHOD:** Forty-six Ss were tested during an 8-hr. period on a battery of 19 tests following each of three experimental "sleeping" conditions of 8-hr. duration spent in bed. The three conditions were: (a) Undisturbed sleep; (b) Disturbed sleep by lowering the room temperature to 0° C. at 2-hr. intervals; (c) No sleep by having S press a button in response to a buzzer sounding at 1-min. intervals. If S failed to respond, a loud bell would sound.

The test battery was designed to provide tasks that were tedious and boring as a contrast to other tasks with high intrinsic motivation. Included were seven paper and pencil tests; three perceptual tests; four psychomotor tests; tests of learning, word fluency, exercise, time to fall asleep, and aggression from ratings on a thematic apperception test.

The tests were grouped into 12 units, which were successively rotated so that each would occur at all times of the day.

**RESULTS:** Twelve tests showed significant decrements following the no-sleep condition, and seven tests showed significant decrements following the disturbed sleep condition. Tests showing maximum decrement

were time of falling asleep, aggression ratings, and pursuitmeter. Five tests (dexterity, steadiness, serial learning, word fluency, exercise) showing no decrement were those judged as having the greatest intrinsic motivation.

CONCLUSIONS: (a) Quantitative test procedures are available which are sensitive to the effects of moderate amounts of sleep deprivation. (b) Humans tend to compensate for fatigue by greater effort or increased efficiency. (c) Compensation during fatigue states is related to the motivation present at the time of performance.

This work was supported by the Quartermaster Research and Development Command.

Baer, Marc *see* Durkee, Ann

Bakan, Paul, Smith, Orville A., & Dickinson, Robt. (*Michigan State College*) **Perceived duration of a visual search task as a function of search speed.**

PROBLEM: The relationship between retrospective estimates of duration of a number-searching task and speed of search.

SUBJECTS: 44 undergraduates.

PROCEDURE: Ss searched for and recorded specific two-digit numbers in a group of 90 different two-digit numbers, arranged in random order in six columns of equal length. To the right of each number found was another two-digit number, indicating the next number to be found. The Ss were instructed to work as rapidly as possible. After a 10-min. practice session, Ss worked for 1 hr. Booklets of 12 pages were used, each page containing the same numbers, arranged in a different random order. The Ss turned to a new page whenever E sounded a bell. The time S could spend on any page varied from 3 to 7 min. The first number searched for on each page was always the same. At the conclusion of the test period, S estimated in minutes the time spent at the task.

RESULTS AND CONCLUSION: For the group as a whole there was a marked tendency toward underestimation of task duration. The mean estimate for the 60-min. period was 40.3 min. Thirty Ss, selected from the group of 44, were divided into two subgroups: (a) the 15 who found the most numbers and (b) the 15 who found the least numbers. The mean perceived duration for fast Ss was 35.3 min.; for slow Ss it was 45.7 min. The difference is significant at the 5% level. The correlation between perceived duration and performance speed, based on the 30 cases, is  $-.43$ . The relationship is significant at the 1% level. Greater performance speed in this task is associated with shorter perceived duration. (Slides)

Baker, C. T., Nelson, V. L., & Sontag, L. W. (*The Fels Research Institute for the Study of Human Development*) **General versus specific areas of ability in IQ change.** (Sponsor, J. I. Lacey)

As a part of the longitudinal program at the Fels Research Institute, Stanford-Binet tests are administered at regular intervals to each child. Consistent trends in IQ gains for some individuals, and IQ losses for others, have been observed and reported. The purpose of the present study is to determine whether subjects who gain in IQ throughout childhood differ in any specific areas of ability from the subjects who lose IQ points, as measured by the difficulty in first passing items on the Binet.

One hundred forty Ss were split into two matched groups of 70 each. Matching variables were age, sex, level of IQ at age three, amount and direction of change in IQ to age twelve. The mean mental age at first passing an item for groups who gained most (Group 1A), changed least (Group 1B), and lost most in IQ (Group 1C) from age  $2\frac{1}{2}$  to age 12 was obtained for 60 items of Form L of the Revised Stanford-Binet Scale.

Seven out of 60 F tests of differences among Groups 1A, 1B, and 1C were found in the first analysis to be significant, but none of these was significant upon replication with Groups IIA, IIB, IIC. There were no trends toward significance in any of the analyses attempted. Within the limitations of this study, it is concluded that no evidence of differences in specific areas of ability exists between those who gain and those who lose in IQ. The group that gains IQ points progressively accelerates in all Binet items. The group that loses IQ points decelerates in all Binet items. This suggests a possible general factor in acceleration and deceleration in ability to learn tasks.

Baker, H. D. *see* Nafe, J. P.

Baker, Lawrence M. (*Purdue University*) **A predictive formula for inhibition in serial learning.**

PROBLEM: To derive a formula for predicting the relative inhibition to learning items at each position in a list of material, and to apply the formula to lists of variable length in serial learning.

If proactive and retroactive inhibition have equal effect and the learning curve is of logarithmic characteristics, we should get a symmetrical curve with the most difficult item in the center of the list. Empirical evidence is that the most difficult item is about two-thirds through the list. It was concluded that a third inhibitory factor was operating. It was postulated that this third effect was introduced by the



necessity of testing and has been identified tentatively as recall inhibition. The interference operates forward. Hence a formula accounting for the three kinds of inhibition becomes:  $I = 2 \log + \log (N - P + 1)$  in which  $I$  = inhibition,  $P$  = position of item,  $N$  = total items.

**PROCEDURE:** Comparisons were made between theoretical inhibition as determined by the formula and empirical results revealing relative difficulty in learning items at each position in a series. Both original and published data were used. Lists varied from 4 to 16 items. All learning was by the anticipation method. **RESULTS:** Data from 12 published reports allowed 44 correlations between findings and predictions. Rank-order correlations ranged between .73 and .99 with 35 above .85. Seven correlations for original data were all above .90.

The introduction of experimental variables in three additional experiments has substantiated hypotheses derived by implications of the formula.

**CONCLUSIONS:** It is concluded that the formula makes possible highly reliable prediction of relative difficulty in learning items at each position in a series, and this is assumed to reveal the relative inhibition operating upon each item as a result of position.

Balthazar, E. E. *see* Ausubel, D. P.

Bamford, Harold E. *see* Townsend, John C.

Banks, H. P. *see* Perkins, M. J.

Barker, David P. *see* Cottle, William C.

Barron, Frank. (*Institute of Personality Assessment and Research, University of California, Berkeley*) Some relationships between originality and style of personality.

**PROBLEM:** Since some persons are regularly original, while others are regularly unoriginal, it must be the case that certain patterns of relatively enduring traits either facilitate or impede the production of original acts. Research on creativity has tended generally to focus on the creative process itself, and on the conditions that trigger the original response, rather than on the underlying disposition toward originality which it may be presumed exists in those persons who are regularly original. The present research is directed toward identifying individuals who perform consistently in a relatively more or relatively less original way, with the end in mind of comparing the more original with the less original persons in terms of style of personality.

**METHOD:** Tests of originality, of intelligence, and of personality were administered to 343 military officers in a 3-day testing program. These tests included seven measures from a battery recently assembled by Guil-

ford *et al.* to assess originality, and included also a number of perceptual-cognitive tasks thought to correlate with originality. Of the 343 officers, 100 participated in a further 3-day program of living-in assessment, during which they took many more tests, the results of which contributed to an over-all assessment of originality. Several of the more commonly used personality tests (MMPI, Rorschach, TAT, etc.) were administered, as well as a large number of procedures presently in the experimental stage, including situational tests, improvisations, and the like. The Ss were also interviewed concerning their background, and they were rated by the assessment staff through the use of such procedures as Q-sorts, the Gough Adjective Check List, trait ratings, and so on. **RESULTS:** Regularity of performance was discernible in the tasks calling for originality, and the more original Ss could be separated from the less original. Originality proved to be related positively to scope and complexity as a person, to impulsivity, skepticism, and daring, to an emphasis on certain presumed derivatives of phallic exhibitionism, and in general to expressive as opposed to suppressive dispositions in the personality. All of the observed relationships, while significantly different from zero, were of a low order of magnitude.

Barrows, Gordon A. (*Veterans Administration*) Factors associated with chronicity of war neuroses.

**PROBLEM:** About a half million veterans are receiving compensation for service-connected neuropsychiatric disabilities. It is not surprising that the stress of military life, especially in time of armed conflict, precipitates mental breakdowns. However, it is more difficult to explain why some veterans recover soon after discharge and others, in spite of all rehabilitative efforts, remain ill. The purpose of this study was to determine if there are variables that can differentiate "chronic" from "nonchronic" cases of war neuroses. **SUBJECTS:** 161 white, male veterans of World War II granted "service-connection" for a neurosis incurred or aggravated by reason of military service. Each member of the sample began psychotherapy at an outpatient Mental Hygiene Clinic of the Veterans Administration.

**PROCEDURE:** Chronic and nonchronic groups were compared with respect to nine variables. The variables were: severity of precipitating stress, compensation, economic status, type of dependency, intelligence, education, intensity of treatment, rank in service, and age at breakdown.

**RESULTS:** The following variables seem important in differentiating chronics from nonchronics: precipitating stress, economic status, type of dependency, educa-

tion, and the intensity of treatment. Intelligence, rank in service, and age at breakdown are less important for our sample. Initial amount of compensation does not seem to affect the outcome of the neurosis, but there is a relationship between amount of later compensation and type of dependency, and chronicity.

DISCUSSION: The results seem to have important implications for both prevention and treatment of neuroses of war.

**Barry, John R., Sells, Saul B., & Cobb, Bart.** (*AF School of Aviation Medicine, Randolph Field*) **Personality characteristics of the potentially successful pilot trainee as determined from a developmental history.**

PROBLEM: To determine differences in experience and attitude which enable the prediction of the future psychological adjustment of pilot trainees.

SUBJECTS: Experimental sample: 320 cadets; validation sample: 110 cadets.

PROCEDURE: A biographical inventory (BI) was completed by all cadets prior to training. None were excluded from training because of their BI responses. At the end of training or at the time of failure, each cadet received a detailed psychological assessment. Ratings of adjustment based on this assessment constituted the criterion. Half of each sample had failed and also had received assessment ratings indicating inadequate psychological adjustment to training; half had passed and were considered to have adjusted well to training. Flying aptitude (stanine) differences between each half were minimized.

Hypotheses concerning attitudes and drives associated with the cadets' adjustment were derived from a literature survey. Those who would adjust well were expected: to prefer gregarious, masculine, aggressive, competitive activities; to be able to accept military authority; and to have had mechanical experience.

RESULTS: On the basis of an item analysis of experimental-sample data, 7 keys, consistent with the above hypotheses, were developed. Six of the keys were cross-validated. Point-biserial coefficients and chi squares (based on  $2 \times 2$  tables of validation-sample data) for the 6 keys were: .22, 1.06; .21, 4.66; .18, 3.65; .26, 5.55; .39, 11.35; and .45, 10.77. All relationships were in the predicted direction.

CONCLUSIONS: The better adjusted cadets had participated in active, athletic, thrill-seeking activities to a greater extent than the inadequate cadets. The former preferred gregarious, competitive work and play; they were willing to conform to authority providing the goals were clear; and they had used precision tools. These interests and background characteristics were not indicated by the inadequate cadets. Developmental history appears to be a fruitful source

of evidence concerning potential adjustment of pilot trainees. (Slides)

**Barthol, Richard P.** (*Pennsylvania State University*) **The "shutter effect": a new perception of apparent movement.**

A previously unreported perception of apparent movement was discovered during an investigation of the relationship of the phi phenomenon to the kinesthetic figural aftereffect. One hundred Ss (students and faculty members) were used.

The task was to view two small lights presented alternately in a totally dark room. The time interval between presentations of the lights was varied systematically and continuously between 10 and 900 msec. The Ss were told to report what they perceived.

Previous studies of the phi phenomenon have mentioned three perceptions usually reported: alternation, movement of the stimuli, and simultaneity (both stimuli appearing at the same time). In addition, something called "pure phi" has been reported occurring between alternation and movement.

This new phenomenon, the "shutter effect," occurs between movement and simultaneity, and differs from previously reported kinds of movement. Subjects consistently reported seeing an object like a shutter oscillating back and forth between the lights, alternately covering and revealing each light in succession.

The color and shape of the shutter-like object varied from individual to individual, but the reports from each S did not substantially vary during experimental sessions. The shutter effect was very stable and was not changed by changing the "set" or the stimulus configuration. However, it was completely and invariably destroyed whenever the background was illuminated.

Not all Ss reported the "shutter"; some reported it only occasionally; some reported it consistently at certain time intervals; some reported it to the exclusion of any other kind of movement.

No physiological, personality, or other differences were found among Ss that correlated with perception of the shutter effect. It is suggested that this phenomenon has not been previously described because either conditions have been inappropriate or it may not have been recognized.

**Basowitz, Harold** *see* Korchin, Sheldon J.

**Battersby, W. S., Pollack, M., Kahn, R., & Bender, M. B.** (*Mount Sinai Hospital*) **"Spatial inattention" in patients with localized lesions of the cerebrum.**

PROBLEM: The theoretical importance of "attention" in determining the response to stimuli has recently been stressed (Hebb). Patients with brain damage

may show gross asymmetries in responding to stimuli in one half of space ("spatial inattention"). The conditions under which this phenomenon occurs have not been well delineated. A parietal lesion in the non-dominant hemisphere is usually cited as a necessary condition, but only selected cases have been reported. The present study attempted to evaluate the incidence and severity of "spatial inattention" in a large number of patients with localized brain lesions to evaluate the factors producing this altered behavior.

**SUBJECTS AND PROCEDURE:** 73 patients with localized tumors of the cerebrum were compared to 40 patients with infratentorial lesions. The experimental Ss were grouped on the basis of the presence or absence of somatosensory and/or homonymous visual field defects. Observations of behavior were made on the performance tests of the Wechsler-Bellevue, modified Gottschaldt figures, Weigl-type sorting test, visual and tactile discriminations, pseudoisochromatic color blindness test, and drawings of objects and persons. Data were also collected on clinical behavior, orientation, and personality history.

**RESULTS AND CONCLUSIONS:** "Spatial inattention" was not found in any of the patients with infratentorial lesions, or in patients with motor, somatosensory, or homonymous visual defects alone. However, 17 out of 22 cases with both somatosensory and visual field defects showed some form of "spatial inattention." This phenomenon was not limited to patients with lesions of the parietal lobe, or with lesions of the nondominant hemisphere. While "spatial inattention" was readily apparent in some cases, in others it was brought out only by special testing. Patients who exhibited this phenomenon were always partially disoriented or tended to deny illness (anosagnosia) or both. This observation suggests that gross cerebral impairment is one of the necessary conditions for the occurrence of "spatial inattention." (Slides)

**Baumgartel, Howard.** (*Survey Research Center, University of Michigan*) **An analysis of the validity of "perceived change" measures.**

**PROBLEM:** As research is extended into more intensive studies of large-scale organizations, increased opportunities exist for conducting field experiments or measuring the effects of natural changes. Often the lack of before measures or a failure to anticipate important factors hamper efforts to carry out such needed longitudinal research. The use of valid perceived-change questions (where respondents are asked to report changes) would expand the power of cross-sectional studies in evaluating change. A large-scale field experiment, with before and after measures, provided an opportunity to test the validity of measuring change with perceived-change items.

**SUBJECTS:** 650 nonsupervisory employees in an electric utility company.

**PROCEDURE:** Paper and pencil questionnaires were administered to Ss before and after (2-year period) an intensive change program. A separate research report demonstrates that significant positive change occurred in the experimental group. A number of perceived-change questions on the after measure also showed significant positive change in the experimental group. Since it was suspected that attitudes influence the perception of change, the analysis was carried out to test two hypotheses: (a) The more favorable a person's attitude toward a given social object, the more he will tend to perceive positive change in that object. (b) Groups that have experienced positive change will perceive more positive change than groups that have not experienced change independent of attitudinal position.

**RESULTS:** Positive correlations were found between all perceived-change items and corresponding attitude items in both control and experimental groups. For all levels of attitude, more persons in the positive-change experimental group perceived positive change than in the no-change control group thus demonstrating the validity of a perceived-change measure in this field situation.

**Beach, Frank A.** *see* Goldstein, Allan C., Schwartz, Marvin

**Beaver, Alma Perry.** (*University of California, Santa Barbara*) **Interest patterns of nurses.**

**PROBLEM:** An investigation of the interest patterns of student nurses through the use of an inventory.

**SUBJECTS:** 147 student nurses from Knapp College of Nursing, Bishop Johnson College of Nursing, and Hollywood Presbyterian Hospital School of Nursing and 120 education majors from University of California, Santa Barbara College and Fresno State College, serving as controls.

**PROCEDURE:** The Altus-Beaver Test, consisting of 100 multiple-choice items each permitting a choice of three answers, designed to reveal interest patterns and personality characteristics, was given to Ss. The answer sheets were then analyzed to see if special patterns of response could be identified which would differentiate the respective groups.

**RESULTS AND CONCLUSIONS:** Mean scores obtained from the two groups on the individual items of the Altus-Beaver Test yielded 77 choices which differentiated one group from the other. The criterion for selection was a *t* of 2.00 or greater. Of these 77 choices, 50 were found to be significant at the .01 level of confidence. Most significant in the findings is the strong interest of the student nurse in science, the laboratory, the sickroom, and social service. Idealism



toward her profession is discernible throughout the pattern of choices, which in part is manifested by a stern conscience and a strong code of duty. This is reinforced by a tendency toward conventionality. On the negative side, the most obvious characteristic is an aversion to things academic (scientific matters excepted). Also noted is dislike of things clerical and of the business world in general. (Slides)

**Beck, Lloyd H., Stovin, James J., & Doyle, John J.** (*Yale University*) **The nose as a molecular analyzer.**

One fundamental problem in olfaction concerns the nature of the response of the nose to a mixture of odorants. If Ss smell a mixture of chemicals, can they analyze the mixture into its components or do they smell a new odor in which the components blend? Early evidence on the problem is equivocal, because it is introspective. A new design based on a  $3 \times 3$  grid, on one axis of which are presented the three possible stimulus combinations of three odorants taken two at a time, and on the other axis of which are recorded all possible response combinations (naming the pairs after sniffing), resolves the problem of introspective evidence in qualitative sensory judgments. If the set of responses of naming the pairs of odorants corresponds to the pairs of stimuli, then the nose responds as a molecular analyzer. The data from six experiments using 112 Ss prove that the nose analyzes the molecular components of a mixture under uncontrolled odor environment conditions, under controlled odor environment conditions, when the odors in the mixture are familiar or unfamiliar, when the odors are presented in liquid or gaseous mixture, when one or both nostrils are used, when children or adults are used. Separate experiments were performed as controls for differential evaporation, and accidental dichorhnic odor analysis. The experiment using children as Ss controlled for the possible learning of laws of odor mixture in the course of the experiment by comparing their ability to analyze mixtures of sounds, mixtures of colors, and mixtures of odorants. Whereas the ear is known to be analytical for sound, the eye is known not to be for color. The question is: is the nose like the eye or like the ear? The experimental results using children show that the nose responds analytically to chemicals in a mixture, as the ear does for sound mixtures, and unlike the eye, which mixes color. These results are significant for each group at better than the .001 level, and  $t$ 's for the individual experiments run in excess of 7.

We acknowledge the support of the Research Corporation of New York in this work. (Slides)

**Beier, Eileen M.** *see* Logan, Frank A.

**Bell, Graham B.** (*Louisiana State University*) **Methodology in leadership research.**

Various laboratories in social psychology have engaged in leadership research for several years. Considerable information of interest and importance has emerged from the studies thus far conducted. However, progress in theory development and generalizable findings is less than might be expected when one considers the many hours of labor expended in collection and analysis of data. Perhaps superficial differences in methodology may impede the collection of data which may be readily synthesized, and upon which later research may be based. In order to test this hypothesis, data were collected in two laboratories which were: (a) available, (b) directed by competent individuals, (c) contributing to the literature, and (d) both using LGD.

This report is based upon 10 groups at each laboratory.

The behavior of each group member in both laboratories was recorded and codified by means of a Bales introduction recorder. Each unit of verbal behavior is classified into 13 categories, e.g., information giving, etc. The same observer recorded the behavior in both laboratories. (Estimated  $r = .90$ .)

Comparison was possible between the verbal responses that characterized the behavior of the group members and the group leaders in laboratory I with the behavior of group members and group leaders in laboratory II.

Significant differences were found between the group behavior in the two laboratories in reference to four categories.

Significant differences between the leader behavior were demonstrated in six categories.

Lacking any ultimate criteria of leadership, we certainly cannot suggest the validity of one laboratory over the other. However, if the leader in one experiment behaves significantly differently from the leader in another, we can suggest that some of the difficulty in building leadership theory and demonstrating generalizable facts is a function of rubber rulers and understandardized experimental technique.

**Bell, Graham B.** *see* Dorsey, Robert

**Bell, Richard Q.** (*National Institute of Mental Health*) **Accelerated and customary longitudinal methods compared on data from the third Harvard Growth Study.**

Data from the third Harvard Growth Study which show a prepubertal growth spurt have been offered in the past as support for the necessity of longitudinal studies, since it is maintained that the averaging of individual curves in a cross-sectional study would have concealed the phenomenon. The data in question

have been analyzed by another method to test the hypothesis that a customary longitudinal study was not necessary to establish the existence of a growth spurt.

This alternative method combines features of both cross-sectional and longitudinal approaches and is designed to accelerate developmental studies. Measurements are obtained from different age groups just as is the case in a cross-sectional study. Each group is remeasured, however, which is not customary. The remeasurements are timed so that the final measurement of a younger group is made at the same age as the initial measurement for the next older group. Temporally overlapping measurements are thus provided which make it possible to link the curves of individuals or subpopulations from adjacent age groups. The differences in level attained at the same point in age for different individuals or subpopulations may be used together with the direction of movement shown by both groups in determining whether any two temporally adjacent curves should be linked. Individual growth curves over the entire time span studied cannot be obtained. It can be contended, however, that they are not necessary since, if the phenomena they manifest are of scientific significance, they should be revealed in the behavior of subpopulations which can be identified by correlating individuals.

The results of treating the longitudinal data in question as though they had been gathered by the accelerated method suggest that the phenomenon of a growth spurt would have been revealed.

**Bender, Morris B., & Fink, Max.** (*Mount Sinai Hospital and Hillside Hospital*) **Alteration in tactile performance as an index of brain dysfunction.**

**PROBLEM AND PROCEDURE:** In the course of a study of the interaction of simultaneous tactile stimuli, a simple performance test measuring the extent of brain dysfunction was developed and called the Face-Hand Test. In this test *S* is asked to close his eyes, and light touch stimuli are simultaneously applied to non-homologous body parts as the cheek and contralateral hand. He is asked to localize by pointing to the parts stimulated. If only one site is reported, he is asked if another stimulus was felt anywhere else. Subsequent trials are carried out with various combinations of cheek and hand. These tests are repeated until *S* is consistently correct, or for at least 10 trials.

**SUBJECTS:** The test has been applied to normal children and adults; patients with organic psychotic states, mental deficiency, and psychiatric disorders; and following the administration of drugs, anesthesia, and electroshock.

**RESULTS:** Normal adults readily localize the two stimuli within the first ten trials. Normal young children and elderly adults, however, make persistent errors (either of failure to report or to localize one of the stimuli). Errors increase in the younger children and in the older adults. A similar gradient is found in mental defective adults, in whom the lower the mental age (Stanford-Binet), the higher the incidence of errors. Ninety per cent of patients with organic brain disease make repeated errors regardless of age; and the incidence and types of errors are related to the extent of cerebral dysfunction. In contrast, patients with other psychotic states perform on these tests like normal adults. Following electroshock therapy, anesthesia, or barbiturate drugs, errors are found to persist during the period of brain dysfunction.

**CONCLUSION:** This test is a satisfactory adjuvant to psychological screening techniques. It needs no special equipment. It is an index of the extent of an organic mental syndrome and of mental age. It is applicable to the serial examination of subjects during the course of any procedure altering brain function. For this purpose a fourfold classification of responses will be described. (Slides)

**Bender, Morris B.** *see* Battersby, W. S.

**Berg, Irwin A.** (*Northwestern University*) **Ideomotor response set: the diagnostic value of symbolic sexual gestures in the counseling interview.**

**PROBLEM:** In psychoanalytical theory the nature of an emotional conflict is believed to be often reflected symbolically by gestural behavior during a therapeutic interview. Thus a person with a sexual conflict typically would be expected to exhibit sexually symbolic ideomotor activity such as rotating or sliding rings or bracelets, clasping fingers in the fist, etc. The present study hypothesizes that a group of persons being counseled for problems which are chiefly sexual in nature will manifest a significantly greater variety and larger number of such diagnostically important symbolic gestures than members of another group also under tension but whose problems are not primarily sexual.

**PROCEDURE:** As a test of this hypothesis, a total of 35 clients representing two groups was interviewed. One group was composed of 14 clients (6 males, 8 females) who, during the initial interview, requested counseling for a variety of sexual problems. The second group was made up of 21 students (12 males, 9 females) who were interviewed in connection with their applications for university scholarship grants. The members of the latter group had no known sexual problems; however all of them were under some tension because of financial worries which could

be resolved by the interview. The groups were matched approximately for age and academic achievement; and interview time was equated by tabulating the following gestures during the last 30 minutes: rotating or sliding, clasping, insertion, pressing, and licking.

**RESULTS:** It was found that both groups revealed all types of gestures, but no significant differences were found in gesture frequency between groups or between males and females. It is believed that the present results indicate that what have been called symbolic sexual gestures will appear merely as a motor manifestation of any emotional disturbance and not as an indication of sexual conflict specifically.

**Berger, Louis M.** *see* Saxe, Carl H.

**Berkeley, Austin W.** *see* Wolf, Irving

**Berkhouse, Rudolph G.** *see* Kaplan, Harry

**Berkovitz, E. E.** *see* Ausubel, D. P.

**Berkowitz, Leonard, & Rosenberg, Seymour.** (*AF Personnel and Training Research Center, Randolph Field*) **The effects of varying combinations of group members on the incidence of leading behaviors.**

**PROBLEM:** Current discussions of leadership tend to emphasize the situational factors in leadership status to the neglect of individual consistency in this status across different situations. Recent research findings suggest that this generality of leadership must also be taken into consideration. However, this "leadership generality" has been largely based upon ratings given to the subjects rather than their behaviors. The present study tests whether this consistency would also be obtained for leading behaviors. The design also permits a test of the presence of both generality and specificity of leadership. There is the possibility that there may be both relatively consistent differences among Ss in leadership behavior over different situations and also some situational variation.

**SUBJECTS:** Two independent samples of nine Ss each were subdivided into three subsamples each. Twenty-seven work groups of three Ss were assembled in each sample by using one S from each subsample. Thus, an S worked with every possible pair of Ss from the other two subsamples but never worked with Ss in his own subsample.

**PROCEDURE:** The groups, using the Ball-and-Spiral Apparatus, had to roll a golf ball up the spiral ramp to a receptacle at the top. Two Os coded the frequencies of orders given by each of the Ss.

**RESULTS:** (a) There are significant differences among Ss in their frequencies of leading responses. This is generality of leadership. (b) Different co-workers tend to elicit different frequencies of these responses.

This is one kind of leadership specificity. (c) Differential frequencies of orders to different co-workers by the various speakers were not significant. This is a second kind of specificity.

The question of generality or specificity of leadership is analyzed in stimulus-response terminology. It is suggested that this is a pseudo problem.

**Bernstein, Howard.** (*Temple University*) **The influence of stress, as induced by delayed speech feedback, on certain learning problems.**

**PROBLEM:** The problem was to study the effect of two factors—varying amounts of delayed speech feedback and varying amounts of material read under the several feedback conditions—on two subsequent objectively measured performances: paired-associate learning and concept formation involving the learned paired associates. Experience with delayed speech feedback, as produced with magnetic tape recording equipment, was operationally defined as stressful.

**SUBJECTS:** 120 college students were volunteer Ss. Qualifying scores on two tests, a specially constructed Paired Word Learning Test and the ACE, were required for selection.

**PROCEDURE:** 12 groups of 10 students per group were employed. The classification of groups was twofold: first, the number of paired associates read under delayed feedback conditions, 35, 70, or 105; second, the amount of delay in feedback during the reading, 0, .1, .2, .3 sec. Following delayed speech feedback experience, all Ss learned a series of other paired associates to one perfect recital by the prompting method. Then Ss attempted a concept test involving the learned material. Scores on these two tasks were treated by the analysis of variance.

**RESULTS:** Group means did not differ significantly on the two selection tests. The mean learning score for groups subsequent to 0 delay (control conditions) differed significantly at the .01 level from the mean scores of groups learning subsequent to .1-, .2-, .3-sec. delay. The mean learning score for groups subsequent to reading 105 paired associates under delay conditions differed significantly at the .01 level from the mean scores of groups learning after reading 35 and 70 paired associates. The mean concept formation score for groups subsequent to 0 delay differed at the .02 level or beyond from the mean scores of groups performing subsequent to .1-, .2-, .3-sec. delay.

**CONCLUSIONS:** Delay in speech feedback and the number of words spoken under delay conditions both adversely affect subsequent efficiency in the learning task. However, only delays in speech feedback adversely affect the efficiency of concept formation involving the learned material.



**Berry, Richard N. (Indiana University) Striate muscle tension and recall of verbal material.**

**PROBLEM:** It is implicit or explicit in some of the theorizing on learning and motivation that tension reduction of some nature is associated with increased recall (more generally, habit strength) of the material associated with such reduction.

**SUBJECTS:** 120 volunteers (male and female randomly assigned to the experimental groups) from the elementary psychology classes at Indiana University.

**PROCEDURE:** There were four experimental groups of 30 Ss each. Each S was presented with the same 4 lists of 10 common, six-letter words. The Ss were instructed to recite the words aloud with the ticking of a metronome. Each list was recited three times before the next list was presented. Immediately following the third recitation of the last list, Ss were asked to write all the words that could be recalled. Groups I and II recited blocks of ten words in immediate succession; Groups III and IV had 1-min. intervals between blocks of words. Groups II and IV were instructed to hold their legs horizontally in front of them (muscle tension production) whenever E so instructed. This was done during, and only during, the entire recitation of the second block of words.

**RESULTS:** Group I, compared with Group II, showed significantly superior recall for the second ten words and a large, but not significantly superior, recall for the third ten words. Group III, compared with Group IV, showed a significantly superior recall for the third block of words and a large, but not significantly superior, recall for the second block of words. On the first and fourth blocks of words the differences between Groups I and II, and between Groups III and IV, were not significant.

**CONCLUSIONS:** In general the data do not support the broad generalization that muscle tension reduction leads to increased habit strength. They do support a modified response conflict hypothesis.

**Berryman, Robert. (Harpur College) The acquisition of secondary negative reinforcing properties by stimuli present during extinction.**  
(Sponsor, H. H. Kendler)

**PROBLEM:** To test the hypothesis that a stimulus present during experimental extinction acquires secondary negative reinforcing properties.

**SUBJECTS:** 66 Sherman strain albino rats.

**PROCEDURE:** 1. Acquisition I: Ss were assigned randomly to two equal groups, then given one 10-min. period daily for 11 days of bar pressing for water reinforcement in a modified Skinner box under 23 hr. and 50 min. of water deprivation. Group I acquired in the dark; for Group II, a light in an overhead light box was continuously on.

2. Extinction: Each group was randomly divided into three equal subgroups (A, B, and C). For Groups IA and IIA, each response produced a light in the overhead light box. For IB and IIB, each response turned the light off. For IC, the light was continuously off; for IIC it was continuously on. All Ss were given one 10-min. period daily for 7 days.

3. Acquisition II: All Ss were given one 10-min. trial daily for 7 days in an apparatus similar to that used in Acquisition I, but with a tilting floor and without a bar. Tilting the floor turned the light on or off. The box-end which would turn the light off was randomized; once selected for a particular S, it remained the same throughout the phase.

**RESULTS:** During Extinction, all groups made significantly more responses than Group IIC, but did not differ among themselves. In Acquisition II, Groups IA and IIA learned to keep the light off by tilting the floor. All other groups were at the chance level of responding.

**CONCLUSIONS:** These results are interpreted as generally supporting the hypothesis that a stimulus present during extinction acquires negative reinforcing properties. Implications of these findings for extinction theory are developed. (Slides)

**Biddle, Bruce J. (Wayne University) An experimental investigation of social expectation theory in the first interview.** (Sponsor, Jacob S. Kounin)

**PROBLEM:** This research investigates the influence of social expectation on selected outcomes of the first interview between counselors and their clients. Three major independent variables were investigated: (a) The expectations of clients for counselor behavior; (b) the power of the counselor over the subject; (c) two types of counselor focus: (i) on the relationship or (ii) on the problem. A fourth independent variable, needs of the client for differing types of counselor treatment, was investigated as a covariance factor.

Dependent variables consisted of 20 indices measuring relevant experiences of clients in an interview, their commitment to maintain a relationship with the counselor, and their willingness to be influenced by the counseling.

**SUBJECTS:** 144 student teachers, broken into two experimental designs.

**PROCEDURE:** Expectations were controlled through two different methods. In the first experiment, Ss were assigned to treatment groups by existing expectations which were measured with a form developed for the purpose. In the second, expectations were induced experimentally by discussing slanted information with Ss. Differential counselor behavior was introduced by use of a role-playing session in which Ss watched a

play showing a counseling session with a client with whom they identified. Two plays were presented showing problem- and relationship-centered counseling. Power differences were introduced by differential instructions read to Ss before the presentation of the play. Needs and dependent variables were measured by forms developed for the purpose. Data were treated by analyses of variance and covariance in two separate  $2 \times 2 \times 2$  designs.

**RESULTS:** Subjects were found to hold strong and stable expectations for counselor behavior in the given areas, although there were marked differences between Ss. Significant over-all effects of expectation, power, needs, and counselor behavior were noted on selected indices. In addition, some indices showed strong effects of interaction. These concerned particularly the interrelationship of power and expectation.

**CONCLUSIONS:** Support for previously developed theories of social expectation is indicated. In addition, findings relating to the extension of such theories are noted, particularly in the direction of a redefinition of the power concept, and in their applications to counseling.

**Birmingham, Henry P.** *see* Chernikoff, Rube, Taylor, Franklin V.

**Bitterman, M. E.** *see* Holtzman, Wayne H.

**Bixenstine, V. Edwin.** (*VA Hospital, Downey, Illinois*) **Secondary drive as a neutralizer of time in integrative problem solving.** (Sponsor, J. Wilson Young)

In its widest setting, this study demonstrates an elaboration of S-R principles to explain behavior heretofore restricted largely to the domain of Ego psychology. Specifically, it extends a study by Mowrer and Ullman of time as a determinant in integrative learning (*Psychol. Rev.*, 1945, 53, 61-90). These investigators discovered that the rat was unable to perform an act in keeping with the more powerful of two conflicting drives if the reinforcement followed the act by more than 15 sec. The present study asks whether or not the introduction of two "signs," each distinct in "pointing to" the particular effect for which it stands, will facilitate this type of performance.

As in the Mowrer-Ullman study, after animals (albino rats) had learned to approach and eat at the buzzer sounding, "taboos" (of 10, 20, and 40 sec.) were arbitrarily imposed such that if the animals thereafter approached and ate during these intervals following the buzzer, they were shocked after a specified lapse of time (20, 50, and 110 sec.). But if they delayed past this taboo period, they could eat without getting shocked. In the present study, the

second sign (blinking light) was introduced with the taboo in such a way that each time the animals came close to the food trough during (and only during) the taboo time, the light was blinked; also, the blinking light preceded each shock application by 3 sec.

With this change of design, animals were enabled to integrate (take food without incurring punishment) when the delay (taboo) was as long as 40 sec. (compared to the 3-sec. "taboo" in the Mowrer-Ullman study), and this capacity was largely unrelated to the time separating the two effects, i.e., the time between taking the food and being shocked. In effect, when the rat is provided a rudimentary "language," time is no longer a delimiter of integration. (Slides)

**Blackman, L. S.** *see* Ausubel, D. P.

**Blake, Robert R.** *see* Fruchter, Benjamin

**Bleke, Priscilla D., & Zener, Karl E.** (*Duke University*) **Determination of relationships between distributions of stimulus items and distributions of judgments under instructions of differing specificity.** (Sponsor, Karl E. Zener)

This paper reports a series of experiments in which Ss ( $N=200$ ) were required to judge the length of singly presented horizontal lines. Five different lines were presented in frequencies whose distribution forms were rectangular, symmetrical unimodal, bimodal, and skewed. In connection with this basic variable of the form of the stimulus distributions the following factors were studied: number of judgment categories, size of the step interval between adjacent stimulus items, experience with various stimulus distributions, and instructions of various degrees of specificity.

Under all conditions Ss were able to make accurate judgments of single stimuli, but in all cases the form of the stimulus distribution profoundly affected the form of the distribution of judgments. For symmetrical distributions the judgments yield a typical ogival psychophysical distribution. For asymmetrical distributions, however, the skew of the stimulus distribution is reflected in the skew of the judgment distribution. These relationships obtain independently of number of judgment categories, size of step interval, and experience of Ss with a succession of different distributions.

This study is in quantitative conformity with the generalization that distributions of judgments are influenced by the central tendency of the context of stimuli upon which they are based, but it also demonstrated that this context effect may be maximized or minimized via experimental manipulation of the instructions. Only when the instructions to Ss were very general, did the asymmetry of the stimulus population exert an effect on the judgment distribu-

tion. When the basis for judgment was left relatively unstructured, there was a consistent correlation between the medians of the judgment and stimulus distributions. When the instructions were more specific, the correlation between medians of the judgment and stimulus distributions was heightened or lessened. (Slides)

**Bleke, Robert C. (Duke University) Interfering response sets as determining factors of reminiscence effects in schizophrenic subjects.**

A recent investigation (*Amer. Psychologist*, 1953, 8, 322) demonstrated that in a verbal learning task schizophrenic patients who had made a poor adjustment prior to their illness (SP) showed greater reminiscence effects under conditions of social punishment (P) than under conditions of social reward (R). Normal Ss as well as schizophrenic patients with good premorbid adjustments (SG) performed similarly under rewarding and punishing conditions. It was hypothesized that these reminiscence effects could be attributed to interfering sets which were operative in the SP-P group. These sets were presumed to dissipate rapidly during an interpolated rest period with resultant performance increments immediately following the rest period in a manner similar to the action of Hull's intraserial inhibitions.

This paper is concerned with a further analysis of the data in an attempt to explore the possible existence of interfering sets which might account for the reminiscence effects demonstrated by this SP-P group. It was found that the response sets for all subject groups were similar except for the SP group tested under the punishment condition. Their response set was not only discrepant from the others but also incompatible with effective task performance, in that it was based solely on Ss' attempt to avoid punishment. As a result it is hypothesized that the avoidance of punishment dominated the behavior of the SP-P group and functioned as an interference producing the reminiscence effects. Under the reward condition, however, when this response set was not operative, the SP group showed no reminiscence effects, as was the case in the other schizophrenic and normal groups.

These findings will be discussed in relation to an interference hypothesis elaborated to account for behavioral deficits in the schizophrenic patient's behavior, and in terms of both current reminiscence theory and views concerning etiological factors in schizophrenia.

This research was aided by National Institute of Mental Health Grant M-629. (Slides)

**Bleke, R. C. see Kalish, H. I.**

**Blough, Donald S. (Harvard University) Dark adaptation in the pigeon.**

**PROBLEM:** To follow the course of dark adaptation in the pigeon and find how it varies with duration of pre-exposure to white light.

**PROCEDURE:** The dark-adaptation apparatus was a modified Skinner box, an optical system, and a switching circuit. Pecking responses on two keys controlled the intensity of a white stimulus spot 5 cm. in front of the pigeon's beak. The only light in the subject chamber during an experimental run came from this spot. Responses to key A reduced the intensity of the spot. Responses to key B increased the intensity of the spot. On a random schedule, responses to A brought complete darkness, and in darkness responses to B brought food. Under these conditions, the bird pecked A until the spot became so dim that it was no longer discriminated from darkness. The bird then began to peck B. The stimulus intensity at which this switch from A to B occurred defined the absolute threshold. The bird kept the intensity oscillating about threshold by alternately pecking A and B. A record of the intensity through time showed the course of dark adaptation. The birds were pre-exposed to white light at 30 ml. for from 1 to 20 min. before being placed in the dark-adaptation box.

**RESULTS:** The method proved to be a quick, reliable way to follow dark adaptation. The curves obtained had a "cone" segment at about 6.0 log  $\mu\text{W}$ , followed by a "rod" segment that levelled off at about 4.0 log  $\mu\text{W}$ . The duration of the "cone" segment varied systematically with pre-exposure time. The final threshold was independent of pre-exposure. On the basis of published data, comparable pre-exposures yield much briefer "cone" segments in the human than in the pigeon. (Slides)

**Blum, Abraham. (Purdue University) A technique for measuring rigidity-flexibility in children and adults. (Sponsor, Ida B. Kelley)**

Clinical analysis has provided numerous hypotheses concerning factors in the development of relative rigidity-flexibility. This investigation is part of a larger study exploring the development of rigidity-flexibility patterns in children. Techniques to measure relative rigidity-flexibility in both children and their parents are proposed, and a positive relationship of rigidity-flexibility of children and their parents is hypothesized. The techniques devised, the Child Transition Test (suggested by Frenkel-Brunswick) and the Adult Transition Test, are based on the concept of "tolerance of ambiguity." Both tests are composed of a series of drawings wherein one figure (dog) is successively altered until it appears in the last drawing as a completely new figure (cat).



The Ss included 17 nursery school children four to five years of age and their 34 parents.

Rigidity-flexibility rankings for (a) the children, (b) the mothers, and (c) the fathers were obtained from the responses to the transition tests.

The Adult Transition Test correlated positively (2% level of significance) with the Wisconsin Card Sorting Test, "an objective technique for the measurement of flexibility in thinking."

The rigidity-flexibility ranking of the children was found to correlate positively, but not significantly, with the rigidity-flexibility ranking of either (a) the fathers or (b) the mothers. However, the multiple correlation of the children's rankings with the mothers' and fathers' rankings was found to be positive and significant.

The findings support the hypothesis advanced and indicate the need for further study of the combined influence of both parents in the personality development of the child rather than the influence of either parent separately.

Preliminary use of the transition technique indicates that further development and extension of this method may provide useful instruments for measuring psychological rigidity-flexibility.

**Blum, Gerald S. (University of Michigan) Perceptual defense revisited.**

**PROBLEM:** Recently the concept of perceptual defense has become the subject of considerable controversy. Prominent in these discussions is Postman's revised position, which maintains that "what appears to be perceptual defense results from the dominance of strong alternative hypotheses rather than from active repression of the inimical or dangerous." In the present study the following hypothesis was submitted to experimental test: Subjects predisposed to use the mechanism of repression in conjunction with a given conflict will, when confronted subliminally with a conflict-relevant stimulus, show defensive behavior directly traceable to the perceptual process itself.

**SUBJECTS:** 17 advanced graduate students in clinical psychology, all of whom were familiar with the Blacky Pictures.

**PROCEDURES:** Ss were assessed for conflict and defense related to Blacky dimensions by means of a series of recall and problem-ranking methods. They were also given the perceptual task of naming four Blacky Pictures flashed simultaneously at a tachistoscopic speed well below conscious awareness. All 11 pictures were called in varying frequencies over 48 trials, but none of the Ss caught on to the fact that the same four pictures were flashed in every trial. This procedure permitted the establishment of four conditions: (a) present pictures: conflict + repression; (b) present pic-

tures: neutral; (c) absent pictures: conflict + repression; and (d) absent pictures: neutral.

**RESULTS:** In accordance with the predictions, pictures in Condition 1 were called significantly less than those in Condition 2, whereas no difference occurred in the comparison of Conditions 3 and 4. Thus, with the variables of selective verbal report, familiarity, set, and antecedent conditions all controlled, an avoidance response directly traceable to the perceptual process was obtained.

**CONCLUSION:** The seeming incompatibility of these findings with the Bruner-Postman hypothesis theory explanation of perceptual defense is reviewed, with the conclusion that current attempts to abandon perceptual defense in the interests of "theoretical parsimony" may very well be premature. (Slides)

**Blumenkrantz, Jack. (VA Hospital, San Francisco) Postfailure recall as a function of generalization of success expectancy.**

**PROBLEM:** To investigate the effect of substitute success on recall after failure on a prior task. Rotter's construct of generalization of expectancy changes states that the degree of success generalization is a function of the goal relatedness (i.e., functional similarity) of the interpolated successes to the original goal. A prediction was deduced from this construct that an increase of success expectancy on the original task would decrease the failure instigated interference, and therefore result in better recall.

**SUBJECTS:** 100 University of Colorado sophomores from the elementary psychology classes.

**PROCEDURE:** A variation of the retroactive inhibition design was employed. Two control and three experimental groups were used. A rote memory learning task, defined to all Ss as a measure of academic competence, was administered. One control group was given a success experience on this task, the other groups a failure experience. A physically identical interpolated task was administered to all the groups. The controls were not informed of the results, while the experimental groups were given a success experience. The degree of goal relatedness to the original task was varied by the verbal definition given the material. The definitions used were "measures" of: (a) general intelligence (Groups I, II, III), (b) leadership ability (Group IV), and (c) social skills (Group V). These were considered to be decreasingly related to the failure on the dimension of goal relatedness.

**RESULTS AND CONCLUSIONS:** As predicted, postfailure recall was better for the groups that had a success experience on an interpolated task with a high degree of goal relatedness to the failed task. Reduction of recall decrement was directly related to the extent

of success generalization from the interpolated to the original task. Theoretical implications are discussed.

**Boguslavsky, G. W.** (*Cornell University*) **A statistical criterion for levels of mastery in conditioning.**

The author proposes a uniform procedure for describing the criterion of mastery in conditioning in terms of a level of confidence. The rational basis for the procedure lies in the assumption that conditioning is mediated by intervening variables referred to as specific vigilance reactions. Mastery is defined as conditioning of the animal's entire repertory of specific vigilance reactions to the overt response.

A technique that enables the experimenter to state with a specified degree of confidence that mastery has been achieved is described in terms of transition probabilities. The technique provides for designation of terminal points in the course of conditioning. The location of these points is a function of the number and distribution of conditioned responses as well as of the total number of trials. Use of the technique in its final formulation requires no training in mathematics.

The procedure shows potentialities of application to problems other than conditioning. (Slides)

**Bond, Nicholas A., Jr., & Bryan, Glenn L.** (*University of Southern California*) **Development and evaluation of objective tests for the measurement of job proficiency of naval electronics technicians.**

**PROBLEM:** The job of the naval shipboard electronics technician is known to be highly complex. It is unlikely that any single test or single type of test would serve as a suitable criterion for the entire job. This paper describes a battery of tests developed to measure six relevant aspects of on-the-job performance of electronics technicians. The battery is essentially performance oriented but is constructed so as to permit group administration by relatively unskilled test administrators.

**SUBJECTS AND PROCEDURE:** The battery was given to over 200 experienced electronics technicians from the Pacific fleet. The subject sample represented all pay grades and was drawn from several types of commands. The tests required a full day and were given to five men at a time.

**TEST EVALUATION:** The tests were evaluated from the standpoints of internal consistency reliabilities and item statistics, correlation of test scores with each other and with supervisor's proficiency ratings, and weights derived from subject judgments as to relevance of the content of each of the tests to their own jobs.

**CONCLUSIONS:** Analysis of the test data indicates that the modified battery shows considerable potential as a criterion battery for the measurement of on-the-job proficiency of electronics technicians in the Pacific fleet. (Slides)

**Bond, Nicholas A., Jr.** *see* Bryan, Glenn L.

**Bordin, Edward S.** *see* Harway, Norman I.

**Boren, John J.** (*Army Medical Service Graduate School*) **Response rate and resistance to extinction as functions of the fixed-ratio schedule of reinforcement.**

The purpose of this study was to determine the effect of fixed-ratio schedules of reinforcement upon resistance to extinction and response rate during training.

Two experiments were performed with male albino rats in the Skinner-box apparatus. In Exp. I each of six groups of animals was given 500 food reinforcements under a different fixed-ratio schedule and then extinguished. In Exp. II a single group of animals was trained on several fixed-ratio schedules until a stable rate of responding was established by each schedule.

It was found in Exp. I that as the fixed ratio increased, the resistance to extinction increased. The relation was approximately linear. These results will be discussed in relation to the Mowrer-Jones response-unit theory and the generalization-decrement hypothesis.

The behavior of individual animals during fixed-ratio training typically showed a break in responding after a reinforcement. Following the break a high rate of bar pressing began and continued without interruption until the next reinforcement. In Exp. II the average rate, the break in responding after a reinforcement, and the "corrected" rate (computed by subtracting out the time occupied by such breaks) increased as the fixed ratio increased. When the animals were shifted from a large ratio to a smaller one upon which they had been trained previously, the average rate was the same as before, but the breaks were longer, and the "corrected" rate was higher. The results of this experiment will be related to Skinner's analysis of fixed-ratio reinforcement. (Slides)

**Bornstein, Harry, Jensen, Barry T., & Dunn, Theodore F.** (*Personnel Research Branch, Personnel Research and Procedures Division, The Adjutant General's Office*) **The reliability of scoring in performance testing as a function of tangibility of the performance product.**

**PROBLEM:** Products of job performance can be classified into tangible, e.g., an assembled weapon, and intangible, e.g., grenade-throwing technique or the se-

quence of steps in first aid. In most cases, group administered performance tests either do not measure intangible products or measure them unreliably. "Delay of process" was the basis for the procedures advocated for reliable measurement of intangible products. The problem was to determine whether intangible products could be measured as reliably as tangible products in group administered performance tests.

**SUBJECTS:** The number of Ss varied for each performance subtest from 178 to 310 basic military trainees. **PROCEDURE:** Ss were tested on a 101-item basic military performance test grouped into 13 subtests. Two enlisted regular army personnel, having a maximum of eight hours of training in administering the test, were stationed at each subtest site. One administered and scored; the other simply scored. Approximately ten trainees performed at a subtest simultaneously. Check lists were used. Fifty-seven of the items had been classified as leading to tangible and 43 as leading to intangible products. Interscorer agreement was computed (using phi coefficients) for each item.

**RESULTS:** The mean of the phi coefficients for tangible items was .78; a mean of .61 was obtained for the intangible items. The SD's were .19 and .23, respectively. Because  $p$  values for some of the items were extreme, use of the phi coefficient as the sole basis of comparison was deemed inadvisable. Consequently, the percentage of agreement between scorers was computed. The mean percentage of agreement for tangible items was 93. The corresponding mean for intangible items was 87. The SD's were .07 and .10, respectively.

**CONCLUSIONS:** It was concluded that intangible products of performance could be measured in a group administered performance test at only a slight loss in scoring reliability. The added validity expected to result from the inclusion of intangible products should more than offset this slight error.

Bornstein, Harry *see* Dunn, Theodore F.

Boulger, John R. *see* Colmen, Joseph G.

Boyd, Richard W., & Di Mascio, Alberto. (*Boston Psychopathic Hospital*) **A quantitative approach to the study of the psychotherapeutic interview.** (Sponsor, Richard W. Boyd)

**PROBLEM:** By means of a quantitative analysis of interaction process (Revised Bales), to investigate, in a case of psychoanalytic therapy, the relationship between interaction process and clinical change in the patient.

**SUBJECT:** A 30-year-old male, married, father of four children, was treated by a senior physician in a hospital out-patient clinic for a total of 44 hours.

**PROCEDURE:** The patient was observed through a one-

way mirror, and heard by audio pickup. Surface leads from an 8-channel polygraph were attached to the patient to obtain physiologic changes during the interview. Simultaneously interaction between psychiatrist and patient was coded electrically onto the moving polygraph tape. Interaction profiles and typescripts were obtained for each of the 44 interviews. Following each session the psychiatrist summarized the case as to the process stage of the therapy and the clinical state of the patient.

**RESULTS:** Comparison of the Bales category profiles of the interviews revealed: (a) that specific patterns of interaction emerged for both psychiatrist and patient; (b) that the patient's profile was less stable and varied with the stage of the therapy (*viz.*: transference, etc.), with clinically judged anxiety, and with the specific topics discussed; (c) that factors such as total productivity, affect productivity, and therapeutic "task achievement" varied as a function of "interaction maneuvers" (e.g., patient's hostility increased as the psychiatrist's productivity decreased); (d) that physiologic measures changed as a function of the affective levels of interaction.

**CONCLUSIONS:** This study demonstrates quantitatively that the psychotherapeutic process is a function of interpersonal maneuvers of both the psychiatrist and the patient; that psychotherapeutic progress can be determined from the relation between "affective" and "task" productivity of patient and psychiatrist. The possibility of the diagnostic use of this method is discussed. The correlation of selected physiologic variables with levels of interaction may be an aid to diagnosis and prognosis of patients in individual psychotherapy.

(Russell Sage Foundation grant)

Brackman, Jack, & Collier, George. (*University of West Virginia and Duke University*) **The dependence of probability of response on the size of the step interval in method of limits.**

**PROBLEM:** The assumption has often been made that the  $P_n$  (probability of response) to a simple, threshold, visual stimulus in a series of stimuli graded in brightness is independent of variations in the procedure of stimulus presentation. A recent series of experiments on the method of limits has shown that procedural variables such as length, intertrial interval, and the method of termination of a series of stimulations, and hence psychophysical function obtained do affect the  $P_n$ . This experiment studies the effect of a further procedural variable, the size of the brightness step interval in series of brightness-ordered stimuli, presented by method of limits.

**PROCEDURE:** The apparatus presented binocularly a 10' monochromatic (510 m $\mu$ ) patch, for a duration



of 1/1000 sec., 20° below a red fixation point. Stimuli were presented at intertrial intervals of 4.6 sec. The step intervals used were .008, .015, .031, and .062 log  $\mu$ l. The presentation procedure alternated ascending and descending series of brightness-ordered stimuli. Four trained Ss were run in three experiments, each employing a different variation on the method of limits.

**RESULTS:** The results were analyzed separately in terms of ascending and descending thresholds, and slopes (1/standard deviation). Ascending thresholds proved significantly lower than the descending thresholds; the magnitude of this effect was a function of the step interval. The highest slope (greatest precision) was associated with the smallest step interval. Further, the slope was found to be related to the variation of the method of the limits used.

**CONCLUSION:** These results support the hypothesis that  $P_n$  in psychophysical measurement is a function not only of the magnitude of the stimulus but also of the immediately preceding history of stimulation and response and demonstrates again the occurrence of serial dependencies in psychophysical data. (Slides)

**Bradt, Kenneth H.** (*Office of Armed Forces Information and Education, Department of Defense*) **A study of reasons for noncompletion of correspondence and self-teaching courses by enrollees of the United States Armed Forces Institute.**

The United States Armed Forces Institute (USAFI) offers a wide range of correspondence and self-teaching courses to men and women in the armed services, and provides an educational service more varied than that of any other single educational institution in the United States. One of the problems with which USAFI is faced is the fact that a large proportion of students who enroll do not follow their courses through to completion. For help in devising a follow-up system that would increase the completion rate, a study was undertaken to determine the reasons why students drop out of their courses. A scientific sampling of enrollees who were inactive in their courses for a period of three months or more yielded a sample of 5,356 students, who were each mailed a four-page, 20-item questionnaire. The mail-out included: (a) the questionnaire; (b) a return franked or stamped envelope; (c) a return self-addressed post card; and (d) a covering letter which explained the purpose of the study, emphasized that the questionnaire was to be anonymous, and requested that the respondent sign and return separately the enclosed post card, certifying that he had returned a questionnaire. Six weeks later, a 58% return had been received, at which time a second mailing was made

to all students who had not returned a post card. Final receipt of usable returns totalled 4,223, or 79%. If the sample members whose questionnaires were returned as undeliverable by the Post Office are subtracted from the sample, the total usable returns represent 82% of all sample members presumed to have received the questionnaire. Relationships were determined between reasons for noncompletion of courses and the following variables: reason for enrolling, branch of service, extent of prior education, age, rank, plans to obtain credit in the course, intention to make a career of the Service, past enrollment in USAFI, and number of courses carried.

**Brady, Joseph V., & Nauta, Walle J. H.** (*Army Medical Service Graduate School*) **The duration of affective changes following subcortical lesions in the albino rat.** (Sponsor, Joseph V. Brady)

Previous research has demonstrated that surgical lesions of the septal forebrain region in the albino rat can produce immediate increases in emotional reactivity and startle response magnitude while diminishing the strength of a previously conditioned emotional response (CER) of the "fear" or "anxiety" type. The present experiment investigates further the duration and specific character of these changes following septal ablation and explores the role of other subcortical structures in emotional behavior.

Twenty-six male albino rats were divided into four groups. In Group I (12 animals), lesions were produced in the septal forebrain area *following* acquisition of the CER. In Group II (6 animals), lesions were produced in the habenular complex of the thalamus *prior* to acquisition of the CER. In Group III (4 animals) habenula lesions were produced *following* acquisition of the CER. Group IV acquired the CER and served as controls. All animals were rated both pre- and postoperatively for emotional reactivity on a seven-item scale, and measurements of startle response magnitude were recorded.

All animals in Group I (septal lesions) showed a significant increase in emotional reactivity and startle response magnitude within 24 hr. after operation. Ratings four to six weeks later, however, without intervening handling, revealed significant abatement of this hyperreactivity. In addition, 6 of the 12 animals in Group I showed significant attenuation of the CER. Histological reconstruction of the lesions in the animals of Group I suggests that attenuation of the CER may be related to the extent of involvement of the fornix system and possibly of the anterior thalamic nuclei.

The animals of Groups II, III, and IV showed no significant changes in either emotional reactivity or

acquisition and retention of the CER. There was some indication, however, that extinction of the CER was more rapid in Group II (habenular lesions *before* conditioning) following operation than in either Group III (habenular lesions *following* conditioning) or Group IV (unoperated controls). (Slides)

Brady, Joseph V. *see* Geller, Irving

**Bramlette, Carl A., Jr.** (*South Carolina State Hospital*) Some relationships between the self concept and personality adjustment.

**PROBLEM:** To investigate the relationships between the perception of the self and personality adjustment in regard to one motivational variable, namely, hostility. **SUBJECTS:** 20 medical and surgical cases (the controls) and 20 nonpsychotic, psychiatric cases (the experimentals), equated for age, race, sex, and education.

**PROCEDURE:** A Hostility *Q* sort was especially devised for this research. It consisted of 76 statements about the self ranging from very hostile to nonhostile. These statements were sorted by Ss to permit a comparison of the object self and the ideal self with respect to the hostility variable. The technique yielded three measures: a correlation between the object self and the ideal self, an object-self hostility score, and an ideal-self hostility score.

**RESULTS:** Both groups showed more hostile object selves than ideal selves. As the object self becomes less hostile, its correlation with the ideal self increases. The experimentals denied more of the *Q*-sort items on the initial free-choice sorting than did the controls. Whereas the object-self hostility scores were more variable for the experimentals than for the controls, the two groups gave similar ideal-self hostility scores. The correlations between object self and ideal self were more variable for the experimentals, with the controls clustering in a middle range of correlations and the experimentals showing significant clusterings in the low and high correlations. The low correlation group within the experimentals contained those individuals diagnosed as "anxiety reaction," while the high correlation group contained those diagnosed as having either conversion symptoms or many somatic complaints. The "anxiety" group considered their object selves more hostile than did the "conversion" group.

**CONCLUSIONS:** The results support the general hypothesis that the degree and type of personality adjustment are reflected in the individual's self concept. An attempt is made to relate these findings to psychoanalytic theory and to the experimental work and theoretical formulations of Sherif, Rogers, and Frenkel-Brunswick. (Slides)

**Brewer, Paul W.** (*University of Denver*) A follow-up study evaluating the effectiveness of psychological examinations administered to adult blind at the start of their vocational rehabilitation.

Eighty-eight cases of adult blind (61 male, 27 female) ranging in age from 16 to 59 were examined from 1949 to 1953. Supervisors' ratings covering subsequent training and placement were established for (a) manual dexterity, (b) maximum vocational potential, (c) cooperation, and (d) personality difficulties. Intercorrelation of raters for the first two scales ranged from .7 to .92, for the third rating from .57 to .79. These criteria were compared to (a) case history data, (b) psychological test data, and (c) the "clinical judgment" of the psychologist as established by a second rating involving a separate set of judges.

Probability values based on chi squares indicated the following significant case-history factors:  $p = .01$  between schooling and manipulatory dexterity, also between schooling and maximum vocational potential; a  $p$  of .05 between special training and maximum vocational potential; and a  $p$  of .01 between personality difficulties and secondary handicap. As for psychometrics, manipulatory dexterity showed a reliable connection with Wechsler results, Minnesota Rate of Manipulation Test results at the .01 level, with the Pennsylvania Bimanual Worksample at the .02 level, and with Kuder Mechanical and Musical scales at the .05 level. Maximum vocational potential was related to Verbal Wechsler scores ( $p = .001$ ), to the Minnesota Rate of Manipulation Test, Displacing and Turning ( $p = .05$ ), and the Pennsylvania Bimanual Worksample, Assembly ( $p = .05$ ). Cooperation and the Minnesota Rate of Manipulation Test (Turning) were related at the .05 level. Personality difficulties showed no reliable relation with any test variables.

The psychologist's judgment relating to rehabilitation prognosis was highly reliable in connection with maximum vocational potential ratings ( $p = .001$ ), showed reliabilities of .02 for personality difficulties and cooperation, and .05 for manipulatory dexterity.

The only factors relating to blindness that were evaluated were degree of sight and blind school attendance, both of which did not seem to be related to any criteria in this sample.

**Brown, Donald R., & Bystry, Denise.** (*Bryn Mawr College and Columbia University*) The differential effects of three types of college community on social-political ideology and personality in women from three ethnic backgrounds.

**PROBLEM:** The study explores the existence of authoritarianism among Catholic, Jewish, and Protestant

women college students; the relationship between authoritarianism and personality, academic achievement, and extracurricular activities; and the effects of three years in three types of college community on authoritarian ideology.

**SUBJECTS:** Ten groups of Ss (293) representing Jewish and Protestant senior and freshmen students at a nonsectarian women's liberal arts college (College A), sorority members at a coeducational university (University B), and comparable groups from a Catholic women's college were tested.

**PROCEDURE:** All Ss were given a modified form of the California F scale made up of 55 items judged to be the most subtle and least offensive of the items reported in the authoritarian personality study; items referring to ethnic groups by name were eliminated. Also each student checked those adjectives descriptive of herself on the Gough Adjective Check List, and all Ss in College A and C took the California Psychological Inventory. Thirteen Jewish and 26 Protestant freshmen from College A were retested during their junior year as a control.

**RESULTS:** Both seniors and freshmen from College C scored significantly higher on the F scale than all other groups. In general, except for Protestant and Jewish freshmen at College A, the Jewish students scored significantly lower than the Protestant students at their class standing. The only groups to show significant decreases in scores between freshmen and seniors were the Jewish group at College A and the Catholic group at College C. The sorority members did not change significantly. College A students tested two years later bear out these results.

A comparison of the 42 highest scorers and the 44 lowest scorers on the F scale resulted in higher scores at the 1% level of confidence for the low scorers on F on the Infrequency, Tolerance, Flexibility, Status, Delinquency, Intellectual Efficiency, and Honor Point Ratio scales.

An item analysis of the adjective self checks confirms the description of the authoritarian personality as presented in the Adorno *et al.* study.

**CONCLUSION:** The challenge to existing ethnocentrism is greater for minority group members in the unstructured environment of College A. Data on the background of Ss confirm this conclusion. Authoritarianism is not related significantly to college grades or activities but is reflected in standard personality scales.

**Brown, Janet L. (Yale University)** The effect of drive on learning with secondary reinforcement.

**PROBLEM:** To study the effect of high versus low drive on (a) the acquisition of secondary reinforcing power

by a light and buzzer, (b) the conditioning of bar pressing when reinforced by the light and buzzer, and (c) the extinction of bar pressing.

**SUBJECTS:** 80 naive male albino rats.

**PROCEDURE:** The experiment consisted of three parts: (a) a light and buzzer were paired with food pellets; (b) bar pressing was conditioned to the light and buzzer; (c) bar pressing was extinguished during an hour of free responding during which there was no light or buzzer reinforcement. Eight groups were run, each consisting of five pairs of rats, one experimental and one control rat per pair. For the latter, there was only one difference in procedure: the light and buzzer were not simultaneously paired with the food pellets. A  $2 \times 2 \times 2$  factorial design was used in such a way that in each of the three parts of the experiment, drive was either high (32-hr. food deprivation) or low (8 hr.). This produced the eight groups: HHH, HHL, HLH, HLL, LHH, LHL, LLH, LLL, the first letter in each group referring to drive at the time of the pairing of the light and buzzer with the food pellets, the second letter to drive at the time of conditioning of bar pressing, and the third letter to drive during extinction.

**RESULTS:** (a) Experimental animals conditioned more quickly ( $p = .001$ ) and made more extinction responses ( $p = .001$ ) than their paired controls, thus indicating that the light and buzzer were effective secondary reinforcers. (b) Drive at the time of the pairing of the light and buzzer with food pellets did not affect the secondary reinforcing power acquired by the light and buzzer. (c) There was some indication ( $p = .04$ ) that animals who learned bar pressing under high drive were more resistant to extinction.

(A duplication of the experiment is in progress to check the last result.)

**Brown, Moroni H., & Bryan, G. Elizabeth. (University of Utah)** Sex differences in intelligence.

**PROBLEM:** In the standardization of the three most widely used individual intelligence scales (Stanford-Binet, Wechsler-Bellevue, and WISC), tests with minimal sex differences were selected, yet in all three tests some sex differences have been consistently demonstrated. The hypothesis that one sex may actually excel the other has been avoided and it is generally assumed that the tests may be slightly biased in favor of one sex or that sex differences were due to sampling bias. Both the S-B and WISC show higher scores for males above age nine, but Wechsler mentioned a slight total score superiority for females on the Adult Scale. In view of the discrepancy between Wechsler's comment and the S-B and WISC findings, the problem of this investigation was to determine the



extent of sex differences on the W-B Adult Scale.

**SUBJECTS:** 400 Ss in groups of 40 for each sex at 5 age levels ranging from 9 to 39 years were used. None of the Ss had been referred for examination or treatment.

**PROCEDURE:** Means and standard deviations for each sex at each age level were computed for each test and for Verbal, Performance, and Full Scale scores.

**RESULTS:** Consistent sex differences in weighted scores were found at all age levels favoring females on Digit Symbol and favoring males on Arithmetic, Verbal, and Full Scale scores.

**CONCLUSIONS:** These findings on the W-B agree with the sex differences noted on WISC and S-B standardizations. Since three different test scales and three different samples of Ss have been used, there seems to be little basis for the assumption that total score differences have resulted from either a biased instrument or biased sampling. In contrast to Wechsler's belief, we have more than a "sneaking suspicion" that the female of the species, though more deadly than the male, is hardly more intelligent.

**Brown, Robert H.** (*Naval Research Laboratory*)  
**The visual discrimination of velocity as a function of the stimulus duration and luminance.**

**PROBLEM:** To determine how stimulus duration and luminance limit man's response to velocity.

**SUBJECTS:** Three men and one woman with normal color vision, good stereopsis, no phorias, and 20/20 far visual acuity.

**PROCEDURE:** Exposure times were varied in seven equal log steps between 1.00 msec. and 3.16 sec. During an experimental session, exposure time was constant. The luminance threshold was measured by the method of limits with forced choice for the discrimination of direction of movement. A small spot of white light moved at uniform speed from the center to the periphery of the dark circular fixation area. The S reported its direction, right or left. Eight rates of movement were used for each exposure time. The experimental conditions were counterbalanced with respect to trials and sessions.

**RESULTS:** 1. Stimulus durations, velocities, and Ss constituted highly significant sources of variation in the luminance threshold for discrimination of velocity. 2. Analysis of variance by the triple classification method for matched individuals yielded highly significant interactions between durations, velocities, and Ss. 3. In view of these interactions, the minimal mean luminance required during the 16 observations at any velocity for a given duration was determined for each S. The product of this luminance and the duration was

constant when the duration was less than 0.1 sec. 4. For exposure times less than 0.1 sec. and for a constant distance of travel by the spot, the luminance threshold was directly proportional to the velocity.

**CONCLUSION:** The luminance-duration constancy and the direct proportionality between threshold luminance and velocity with distance constant suggest that the visual discrimination of velocity under the conditions of this experiment may be regarded as a single sensory event controlled primarily by photochemical activity in the retina. (Slides)

**Brown, William F., & Holtzman, Wayne H.** (*University of Texas*)  
**The importance of study habits and attitudes in the scholastic achievement of high school and college students.**

**PROBLEM:** (a) To determine the extent to which study behavior and attitudes toward studying contribute to academic achievement in high school. (b) To determine the extent to which such attitudes in high school are predictive of subsequent college scholarship. (c) To determine the stability of these attitudes during the period of transition from high school to college. **SUBJECTS:** 228 girls and 227 boys who were high school seniors in the spring of 1953.

**PROCEDURE:** The Survey of Study Habits and Attitudes (SSHA), a standardized measure of study methods and motivation for studying, was administered to the senior students by their teachers. A measure of intelligence and a three-year high school grade average were also obtained. Included among the entering freshmen who were routinely administered the SSHA at The University of Texas were 62 women and 81 men who had taken the SSHA previously in high school. Grade-point averages based upon the first semester of college work were computed for these 143 freshmen. Intercorrelations of all variables were obtained separately for men and women.

**RESULTS:** Correlations between scores on the SSHA and high school grades were .48 and .51 for men and women, respectively. Correlations between scores on the high school SSHA and subsequent college grades were .50 for men and .44 for women. This compares favorably with the predictive value of the retest SSHA given after the students had entered college. Test-retest correlations for the SSHA were .83 and .80 over the period from high school to college.

**CONCLUSIONS:** (a) Study habits and attitudes which are developed in high school students play a significant role in both high school and subsequent college achievement. (b) Attitudes of high school seniors toward studying remain relatively stable through the

period of transition from high school to college. (Slides)

**Brožek, Josef, Franklin, Joseph C., & Guetzkow, Harold.** (*Laboratory of Physiological Hygiene, School of Public Health, University of Minnesota*) Psychological impact of physiological stresses: acute starvation with hard physical work.

Deterioration of fitness was studied in the Laboratory under stresses involving diet (qualitative and quantitative deficiencies), physical environment (high temperatures), and the human organism itself (hard work, lack of sleep). The physiological conditions duplicated, in relevant aspects, a number of practically important emergency situations. The study on acute starvation was carried out with a group of 12 normal young men who went without food for four and one-half days on two occasions about six months apart. Except for intellectual tests, the results refer to the second experiment. Water intake was not limited. Physical work consisted principally in walking for several hours on an inclined motor-driven treadmill. The caloric deficit reached about 16,000 calories.

During fasting, with a high rate of energy expenditure, there was a significant deterioration in the tests of speed (tapping,  $F = 28.0$ ; hand and arm movements,  $F = 16.8$ ; complex reaction time,  $F = 19.8$ ) and coordination (pattern tracing, number of contact errors,  $F = 17.2$ ; duration of errors,  $F = 31.5$ ) but no change in grip strength and insignificant decrease in back pull ( $F = 3.97$ ). Significant increase was observed in body sway ( $F = 7.8$ ), a decrement in flicker fusion frequency ( $F = 14.1$ ). In the battery of six short tests of intellectual functions, significant deterioration was obtained for perception of spatial relations ( $F = 6.7$ ) and for word fluency ( $F = 5.2$ ) but not for perceptual speed, memory, number facility, and inductive reasoning. In the Minnesota Multiphasic Personality Inventory large and statistically highly significant increases were noted in the standard scores on five scales ( $Hs$ , 29;  $D$ , 22;  $Hy$ , 18;  $Pd$ , 12;  $Sc$ , 7;  $Pt$ , 6). A marked deterioration in the feeling of well-being was reflected in the self-ratings specifically designed for the study of physiological stresses.

Information obtained in the present study provides a useful background for "applied" investigations on the reduction of deterioration in performance capacity and personality, obtained by feeding emergency ("survival") rations. (Slides)

**Brueckel, Joyce E.** *see* Robins, Alexander R.

**Bruner, Jerome S.** *see* Matter, Jean, O'Dowd, Donald D., Tagiuri, Renato

**Bryan, G. Elizabeth** *see* Brown, Moroni H.

**Bryan, Glenn L., & Bond, Nicholas A., Jr.** (*University of Southern California*) The automats: a self-recording apparatus for the measurement of proficiency in diagnostic problem solving.

This paper describes an apparatus which serves as a substitute for electronic equipment in the electronics performance testing situation. The device retains much of the real and face validity of the job sample test while avoiding some of the more serious limitations of that type of test.

The examinee is confronted with a problem situation which can be solved by the appropriate sampling of approximately 500 available items of information. Each item of information is available to the subject at any time, although only one item is available at any given moment. The apparatus automatically records in serial order each of the items of information sought. Over 100 alternative corrective actions are available as potential problem solutions. The task of the examinee is to sample the available information and determine the proper corrective action necessary to eliminate the difficulty. A complete step-by-step account of the problem-solving sequence and the attempted solutions is automatically recorded on a moving tape. The apparatus contains many foolproof features as well as provisions for timing the performance.

Scoring procedures and item statistics based upon data obtained from a large sample of naval electronics technicians are presented along with its relationships to other methods of measuring job proficiency. (Slides)

**Bryan, Glenn L.** *see* Bond, Nicholas A., Rigney, Joseph W.

**Buchwald, A. M., & Davis, R. C.** (*Indiana University*) Somatic responses as affected by stimulus intensity and repetition.

**PROBLEM:** To detect patterns of autonomic and skeletal muscle response to auditory stimuli and investigate the effect of stimulus repetition and stimulus intensity variation upon these patterns.

**SUBJECTS:** Ss were 47 students from introductory psychology classes.

**PROCEDURE:** For one study, nine autonomically controlled variables were recorded from 17 Ss for 10 repetitions of a 98-db tone. For another, 10 such variables plus 2 channels of EMG were recorded from 30 Ss for 4 presentations each of 70-, 90-, and 120-db tones.

**RESULTS:** While simple repetition produces a decrease in the response size in the other variables, it increases the respiratory response. The second study confirms

these results and shows further an intensity repetition interaction in certain responses. All variables, with the exception of chin volume, show a significantly larger response to 120-db tone than to the 90- or 70-db tone. The response magnitudes increase in an accelerated fashion over the intensity region studied.

CONCLUSIONS: (a) A pattern of responses involving all recorded variables is produced by auditory stimuli. (b) The pattern of somatic responses changes with stimulus repetition. (c) No single variable can be taken as indicative of the state of the entire set of responses. (d) The magnitude of responses increases with increasing sound intensity (at least from 70 to 120 db). (e) The pattern of somatic responses seems to be fairly stable, regardless of tone intensity, at the initial presentation of tones of differing intensity, but the pattern changes with presentation of a series of varying intensities. (Slides)

Buckner, Donald N. *see* Mackie, Robert R.

Burgess, George G. (*AF Personnel and Training Research Center, Chanute AFB*) **Significance of the difference between biserial correlation coefficients.**

In comparing the predictive effectiveness of two variables, knowledge of the significance of an obtained difference in the estimate of predictive power is desirable. In the case where the variable to be predicted is in the form of a dichotomy, the estimate of predictive power is typically a biserial or point biserial correlation coefficient. Since these are based upon the ratio of the difference between means to the standard deviation, their significance can be estimated from estimates of the significance of differences between means.

Similarly, the significance of differences between two biserial coefficients can be estimated from the significance of the difference between differences between means. This significance can be expressed in terms of the biserial coefficients through algebraic manipulations.

If we begin with the usual formulas for biserial correlation and for the significance of differences, the following expression is derived for the standard error of the difference between two biserial correlations with a common dichotomized variable.

$$S_{r_{xc}-r_{yc}} = \sqrt{\frac{\frac{2pq}{Z^2}(1-r_{xy}) - (r_{xc} - r_{yc})^2}{N-2}},$$

where  $x$  and  $y$  are the two continuous variables and  $c$  the dichotomized variable;  $r_{xy}$  is a product-moment coefficient,  $r_{xc}$  and  $r_{yc}$  are biserial coefficients,  $p$  is the

proportion of cases on one side of the dichotomy and  $q$  is its complement and  $z$  the ordinate of the normal curve at the point of dichotomy.

A parallel expression to be used for the point biserial is also presented.

Burke, Laverne K. *see* Katz, Aaron

Bush, William R. (*University of Rochester*) **The effects of wave length variation upon the course of early light adaptation.**

PROBLEM: To determine, by the intensity-discrimination method and as a function of wave length, the course of foveal light adaptation during the first fraction of one second.

SUBJECTS: Three well-trained males.

APPARATUS: Two beams of light were foveally viewed as concentric circular fields. The larger, subtending a visual angle of  $4^\circ 44'$ , was the adapting stimulus; the smaller,  $47'$ , was a test flash of 0.04-sec. duration. The time between onset of the adapting stimulus and the test flash was varied from  $-0.15$  (the test flash preceded the adapting stimulus) to  $+0.45$  sec. The luminance of the adapting stimuli (equated by flicker photometry) was approximately 13 mL.

PROCEDURE: Following dark adaptation, test-flash thresholds were determined by a descending method of limits, using "trials" as follows: (a) the adapting stimulus came on; (b) the test flash came on at a set time interval relative to the adapting stimulus onset; and (c) the adapting stimulus went off. The  $S$  then regained his previous level of dark adaptation before the next trial. Three nearly monochromatic lights (red, green, and blue) were employed in all possible adapting stimulus-test flash combinations. Thresholds were determined at 12 time intervals with a counterbalanced design.

RESULTS AND CONCLUSIONS: 1. The largest selective effect of wave length occurred from 0.00 to  $+0.05$  sec., where the following results were obtained: (a) the greatest adaptive effects uniformly occurred for monochromatic combinations where  $\Delta I/I$  ranged from 0.48 (red on red) to 0.60 (green on green); (b) a lesser effect occurred for heterochromatic combinations where  $\Delta I/I$  ranged from 0.03 (blue on red) to 0.43 (green on blue).

2. These selective effects were in the same direction but greatly reduced after 15 min. of adaptation.

3. Interchanging the adapting stimulus and the test flash (i.e., from red on green to green on red) produced entirely different functions. (Slides)

Buss, Arnold H. *see* Durkee, Ann

Bystryn, Denise *see* Brown, Donald R.



**Cahill, Hugh E., & Hovland, Carl I.** (*Yale University*) "Contiguity" and the role of memory in the assimilation of information in concept learning. (Sponsor, Carl I. Hovland)

**PROBLEM:** Hovland and Weiss's results indicated superior learning of concepts when instances were presented simultaneously rather than successively. This outcome would be explained by some theorists as attributable to the operation of "contiguity." A technique was developed in the present experiment to analyze this explanation by a detailed comparison of the learning process under the two conditions.

**PROCEDURE:** The concept model was the same as in the earlier experiment. Geometric figures varying in form, number, and shading were used. "Negative" instances only were presented, two sets of the minimum number necessary to derive the concept being employed. The *Ss* were 36 college students. For the presentation of two of the concepts, which varied in complexity, each instance was exposed for 30 sec. and then turned face downward. Two equivalent concepts were presented at the same rate but with the instances remaining face upward thereafter. The progress of learning was studied by a technique requiring *Ss* to "guess" the appropriate concept after each instance was presented.

**RESULTS:** As in the previous experiment, *Ss* reached the correct solution more rapidly under the simultaneous than under the successive condition (where earlier instances were no longer visible). The principal difference between the hypotheses developed under the two conditions was not in the response to the instance at the time of its presentation but in the utilization at a later time of information provided by the instance. The patterns of change in hypotheses under the two conditions will be described in terms of "values" and "dimensions" which were altered or remained unchanged on successive trials. Curves of retention constructed on the basis of the extent to which information presented varying numbers of times was utilized will be presented. The implication of the results for a "contiguity" theory will be discussed. (Slides)

**Calden, George, & Thurston, John R.** (*VA Hospital, Madison, Wisconsin*) The attitudes and emotional reactions of tuberculosis patients.

**PROBLEM:** The psychology of the tuberculosis patient has long been a topic for speculation by physicians, sociologists, novelists, and poets. Relatively few studies, however, have been undertaken to distinguish fact from fancy in this field. The aim of this study is to investigate the attitudes and feelings of the tuberculosis patient in a systematic fashion.

**SUBJECTS:** 306 adult, male patients in a veterans tuberculosis hospital.

**PROCEDURE:** The Madison Sentence Completion Form, a technique designed specifically to evaluate the attitudes and emotional reactions of tuberculosis patients, was administered to the entire patient population of a tuberculosis hospital. By completing a series of 80 incomplete sentences the patient expresses (a) his reactions to having tuberculosis, (b) his feelings regarding the "social stigma" of the disease, (c) his current fears, worries, likes, dislikes, and hopes for the future, (d) his ability to adjust to bed rest and prolonged hospitalization, (e) his perception and reaction to lung surgery and drug therapy, (f) his feelings about his enforced dependency on the hospital staff, (g) the qualities he wishes for in the doctors and nurses, (h) his reactions to fellow patients and specific ward activities, and (i) his feelings about leaving the hospital prematurely, against medical advice.

**RESULTS:** Detailed information in these significant attitudinal areas was obtained. Analysis of data indicated that most of the patients experience severe emotional upsets upon discovering they had tuberculosis, feel like "social outcasts" as a result of hospital confinement, have marked difficulties in adjusting to bed rest and in accepting the enforced dependency state. Most patients, however, feel optimistic about the future, despite the frustrations of hospital living. Significant differences in attitudes toward doctors and nurses are expressed. Changes in attitudes at varying stages of hospitalization were observed. (Slides)

**Caldwell, Bettye M.** (*Northwestern University*) Response expectancy as a variable in mother-child interaction.

**PROBLEM:** Investigation of the ongoing process of mother-child interaction with its potential for reward for either or both members of the pair is essential for complete understanding of the relationship. One factor that may affect the mutual reward value of the interaction is the ability of each member of the pair to anticipate the effect of his or her behavior on the other. Where a relationship is harmonious, such predictions should be fairly accurate.

**SUBJECTS:** 20 disturbed mother-child pairs and 15 comparable nondisturbed mother-child pairs.

**PROCEDURE:** Each child was asked to indicate his replies to the social situations in the Rosenzweig Picture-Frustration Study and to guess how his mother would respond to his answer in those situations dealing with mother-child interaction. Each mother was asked to guess how her child would react in the same situations and also to indicate her reply to his response. Both the initial responses and the subsequent

replies were classified as to whether they emphasized (a) the prevailing need of the respondent, (b) the need of the other member of the pair, or (c) the needs of both. In addition the mother gave her responses to the adult form of the P-F.

**RESULTS:** While specific prediction of individual responses was no more accurate for either the mothers or the children of the normal group, prediction by the normal mothers of over-all response pattern of their children was considerably more accurate. Furthermore, in the normal group correlations between the mothers' own responses and predictions of the children's responses tended to be higher than those obtained between the children's responses and the mothers' predictions, suggesting positive identification. In the disturbed group, correlations were consistently lower and frequently negative. Implications of the results in terms of the reciprocal nature of the social learning process will be discussed. (Slides)

**Calvin, Allen D.** *see* Hoffmann, Fredric K., Perkins, M. J.

**Campbell, Byron A.** (*Yale University*) **The fractional reduction in noxious stimulation required to produce "just noticeable" learning.**

**PROBLEM:** The typical procedure in investigating the reinforcing value of a reduction in a strong external stimulus has been to reduce the noxious stimulus from some high intensity to zero. Thus the stimulus is not merely reduced, it is stopped completely, as when the animal runs off the charged grill or turns a wheel which stops the shock. The purpose of the present study was to investigate the reinforcing value of partial reductions of noxious stimulation. Specifically, the study sought to discover the proportions of stimulus intensity reduction necessary to produce learning at different intensity levels. A corollary question was whether those proportions were related to the intensity levels in any systematic manner.

**METHOD:** On the basis of preliminary research, "white noise" was selected as the noxious stimulus. Several intensities of white noise ranging between 80 and 115 db were used as "reference" levels, and varying proportions of noise reduction were used as reinforcement. The learning consisted of acquisition of a preference for the side of a tilting cage receiving the lower of two intensities. Larger proportions of noise reduction produced stronger preferences, and "just noticeable" learning was defined as the point at which the curves relating proportion of noise reduction to percentage of preference crosses the 75 per cent level. In all, 28 groups of six rats each were run at seven different reference levels.

**RESULTS AND DISCUSSION:** The results of this study showed that the proportion of noise reduction re-

quired to produce "just noticeable" learning varied systematically from fractions greater than one at intensities of 90 db or less to fractions of approximately .75 at 110 and 115 db. These results are contrasted with findings on stimulus discriminability and with findings on deprivation-produced drives where similar procedures of partial drive reduction give different results. (Slides)

**Carlson, Earl R.** (*Human Resources Research Office, George Washington University*) **Attitude change through modification of attitude structure.**

**PROBLEM:** To demonstrate the importance of two sources of affect of an attitude, i.e., its favorableness or unfavorableness. This study tests the hypotheses that attitude change will result from: (a) changes in the perceptions by the individual that the attitude situation (in the present case "allowing Negroes to move into white neighborhoods") is a means for attaining values or goals that the person desires, and (b) generalization from changes in related attitudes. **SUBJECTS:** 165 University of Michigan undergraduates.

**PROCEDURE:** 126 experimental Ss took three measures before and after a procedure which attempted to get Ss to perceive that abolishing segregation would result in the attainment of four selected values: (a) measures of attitude toward "allowing Negroes to move into white neighborhoods," and five related issues; (b) ratings of 25 general values in terms of how much satisfaction each would give the individual; and (c) ratings of the extent to which "allowing Negroes to move into white neighborhoods" is perceived as leading to, or blocking, the attainment of each of the 25 values. Thirty-nine control Ss took the measures but did not receive the change procedure.

**RESULTS:** (a) Changes in the "perceived instrumental relationships" were related to changes in attitude for Ss whose initial attitudes were moderately favorable or moderately unfavorable. (b) The experimental procedure changed "perceived instrumental relationships" and attitudes in the predicted direction. (c) Persons with moderately favorable or unfavorable attitudes changed more frequently in a positive direction than persons extremely favorable or unfavorable; prejudiced Ss were affected negatively by the change procedure. (d) There was generalization of attitude change to related issues, but the degree of generalization was not demonstrated to be a function of the similarity of attitude situations.

**Carlton, Peter** *see* Ramond, Charles K.

**Carpenter, C. R.** *see* Hirsch, Richard S.

**Carpenter, John A.** (*Brown University*) **Species differences in taste preferences.** (Sponsor, Carl Pfaffmann)

The responses of three species, the cat, rabbit, and hamster, to five standard solutions were studied. The solutions employed were NaCl, KCl, sodium saccharine, quinine hydrochloride, and sucrose. The two-bottle method (water in one bottle, solution in the other) was used. Each concentration was presented for 48 hr. Each series of concentrations increased by  $1/3$  log molar steps.

The different solutions were classified into four categories according to the characteristics of the water and solution intake curves. These categories were: preferred, not discriminated, avoided, and high threshold avoidance. Preferred solutions were those that showed at least one concentration at which the intake of the solution was significantly greater than that of water. Solutions in which the water and the solution intake were equal at all concentrations were called not discriminated. An avoidance solution was one in which the intake of the solution decreased while the water intake increased with increasing concentrations of the solution. A solution whose intake decreased while that of water increased only at very high concentrations was called high threshold avoidance. The preferred solutions were as follows: for the cat, NaCl; for the rabbit, NaCl, sucrose, and sodium saccharine; for the hamster, sucrose and sodium saccharine. Cats did not discriminate sucrose. Cats avoided QHCl, sodium saccharine, and KCl. Rabbits avoided KCl. Hamsters avoided NaCl and KCl. QHCl fell into the high threshold avoidance category for hamsters and rabbits.

KCl is the only compound that was classified the same for all species, and there is some doubt whether or not it should be called an avoidance compound for rabbits. With the exception of KCl, none of the compounds was classified in the same category for all three species. These results emphasize species differences in preferences for taste solutions. (Slides)

**Castaneda, Alfred, & Palermo, David S.** (*Iowa Child Welfare Research Station*) **Motor performance as a function of amount of training and stress.**

The present study is concerned with the assumption (Hull) that total effective drive (D) combines multiplicatively with all those habit tendencies activated in a given situation. On this assumption it would be expected that performance would be deleteriously affected by an increase in drive if the stronger tendencies activated are incorrect relative to the correct ones and that the degree of impairment

is a positive function of the strength of the competing incorrect tendencies.

**SUBJECTS AND DESIGN:** 84 fifth-grade Ss were randomly assigned to one of four conditions. Half were given 25 pretraining trials on a motor task, the other half 50. All were then given 50 relearning trials. Half of the Ss in each of the pretraining groups relearned under stress.

**APPARATUS AND PROCEDURE:** The apparatus consisted of a rectangularly shaped box with five push buttons arranged horizontally on a sloping panel. Directly above was a 1-in. diameter aperture through which one of five different colored lights could be exposed. Any push button could be made to turn off any light by means of two rotary selector switches. Using self-corrected trials, Ss were required to learn which button turned off which light. For the relearning three of these S-R connections were changed, two remained the same. An electric timer was so connected that it was activated only when a light was on. A correct response turned off the light and stopped the timer. For the stress condition Ss were informed that speed was the measure of their learning ability, and the timer was placed so that it was clearly visible. This condition was assumed to increase the drive level.

**RESULTS:** With total errors on the changed S-R connections on the relearning trials as the measure of performance, it was found that an increase in drive significantly increased the number of errors. A tendency for the increase to be positively related to the amount of pretraining was found. This accords with the basic assumption of the study.

**Chambers, Randall M.** (*R. B. Jackson Memorial Laboratory*) **Effects of intravenous rewards on learning and hunger drive.**

**PROBLEM:** Basic assumptions implicit in Hull's drive reduction theory of reinforcement were investigated. Is direct reduction of nutritive tissue need sufficient for learning to occur, even in the absence of consummatory responses and secondary cues? Do intravenous reward injections affect hunger? In the intravenous reward situation, is learning related to blood sugar change, general activity, degree of starvation, weight loss, emotionality, and amount of reinforcement? By what physiological mechanisms may nutritive injections be rewarding?

**SUBJECTS:** 35 dogs and 82 rabbits of known genetic stock.

**PROCEDURE:** Time, rate, place, and activity pattern of each animal were automatically recorded as it received continuous automatic intravenous injections of .5 molar glucose, .5 molar xylose, or physiological saline paired with instrumental responses to certain of 7 identical floor plates. Experimental and control



animals were starved 0, 1, 3, 4, and 6 days prior to a 90-min. test period, in which measures were taken of nutritive and nonnutritive reward plate preference, general activity, urination and defecation, blood sugar changes, and quantity of solution injected. Later, effects of injections on eating behavior were observed. Finally, leg, back, ear, and rectal temperatures and breathing rates of starved rabbits were recorded continuously during intravenous glucose, xylose, and saline treatments.

**RESULTS AND CONCLUSIONS:** Starved rabbits, but not dogs, showed significant increases in preference for reward plates paired with intravenous glucose, and significant decreases in preference for plates paired with xylose or saline. Rabbits showed significant relationships between learning and starvation, change in blood sugar, emotionality, and activity level. Glucose injections were followed by differential rises in temperature, whereas xylose and saline were generally followed by decreases. The rewarding effect of glucose may be a general warmth resulting from both the initiation of metabolic processes and osmotic transmission of fluids. Peripheral as well as central mechanisms are involved. (Slides)

**Chernikoff, Rube, Birmingham, Henry P., & Taylor, Franklin V.** (*Naval Research Laboratory, Washington, D. C.*) **A comparison of pursuit and compensatory tracking in a simulated aircraft control loop.**

**PROBLEM:** In previous comparisons of pursuit and compensatory tracking systems it was found that the pursuit mode resulted in greater accuracy when direct, or unaided, control was used. With aiding applied to both the pursuit and compensatory modes, no difference in performance was found between the two systems. The present experiment was designed to compare the use of compensatory and pursuit tracking systems in a simulated aircraft control loop. In this situation there are two integrations between the displacement of the tracker's joy stick and the system output as indicated on the display.

**SUBJECTS:** Five Navy enlisted men.

**PROCEDURE:** The compensatory and pursuit conditions were compared on both a "slow" and a "fast" course. The slow course consisted of a complex of three sine waves, 3 1/3, 2 2/9, and 1 1/3 cycles per minute. The fast course frequencies were three times that of the slow course, 10, 6 2/3, and 4 cycles per minute. The four conditions were presented in randomized order in blocks of six trials per condition for 12 daily sessions. One practice trial preceded each block of scored trials. A trial was 1 min. in duration, with the last 45 sec. scored by an error integrator.

**RESULTS AND CONCLUSIONS:** The *t* tests on the data

taken during the last five sessions showed pursuit tracking to be significantly more accurate than compensatory with the fast course ( $p < .01$ ). However, there was no significant difference in accuracy between the two modes for the slow course. It is concluded that although the fast course showed pursuit to be significantly better than compensatory, the amount of the improvement is far less than that found in previous comparisons of the two tracking systems when no aiding was used. (Slides)

**Chesler, David J.** *see* Seeley, Leonard C.

**Cho, James B.** *see* Grodsky, Milton A.

**Christensen, Julien M.** (*Aero Medical Laboratory, Wright Air Development Center*), & **Crannell, Clarke W.** (*Miami University*) **Tachistoscopic and perimeter training on the visual form field.**

**PROBLEM:** Certain experimenters have suggested that tachistoscopic training and training in peripheral viewing of objects lead to certain generalized improvements in such tasks as reading and utilization of extramacular retinal areas for the perception of form. These experiments led to a hypothesis that a general expansion of the visual form field (i.e., peripheral visual acuity) is possible. The experiments presented in this paper deal with a series of attempts to establish the basis for and nature and extent of transfer to other visual tasks following perimeter and tachistoscopic training. Such training, if successful, would have wide applicability in such diversified tasks as remedial reading, piloting of aircraft, automobile driving, etc.

**SUBJECTS:** Ss were undergraduate students at Miami University.

**PROCEDURE:** Different groups of Ss were given extensive training on tachistoscopes and perimeters. They were then tested for evidences of transfer to various visual tasks of varying similarity to the training task.

**RESULTS:** There was no evidence of transfer to other tasks except when the test task was very similar to the training task. The tests included such tasks as a reading test, a dial check-reading task, and visual pursuit.

**CONCLUSIONS:** The most reasonable conclusion at present seems to be that the improvements demonstrated in training of this nature are the results of Ss' capacity for learning to respond to minute elements of the stimulus pattern (reduced cues). These experiments offer no support for a generalized improvement in peripheral visual acuity. It is believed that the discrepancy between these experiments and the findings of other experimenters can be explained in terms of methodological errors, sampling errors,

inadequate statistical evaluations, and acceptance of anecdotal material as scientific evidence. (Slides)

**Cleveland, Sidney E., & Fisher, Seymour.** (*VA Hospital, Houston, Texas*) **Body-image boundaries in various psychosomatic illnesses.**

**PROBLEM:** Previous research by the present authors demonstrates that rheumatoid arthritis unconsciously think of their bodies as covered with a hard outer shell. They conceive of this shell as a barrier against psychological threats and utilize it as a primary defense. Arthritis involves a stiffening of the musculature in the outer body layer. Accordingly, it was postulated that other patients choosing psychosomatic symptoms involving the body surface (e.g., neurodermatitis) should show similar body-image fantasies. They, too, should think of their bodies as surrounded by a sheath providing psychological protection.

In contrast, it was hypothesized that patients choosing symptoms involving the body interior (e.g., peptic ulcer) regard the body surface as permeable. That is, they regard their body exterior as an inadequate defensive barrier and easily penetrated.

**SUBJECTS:** 25 male rheumatoid arthritis; 25 male neurodermatitis patients; 25 male peptic ulcer patients.

**PROCEDURE:** Each patient was interviewed intensively. The following projective tests were administered: Rorschach, TAT, Figure Drawing. Raters abstracted from the data responses referring to the body image. These responses were grouped in terms of the degree of boundary hardness or permeability they implied. Chi-square tests were made of the comparative frequency of each type of boundary response in each of the subject groups.

**RESULTS AND CONCLUSIONS:** The arthritic and neurodermatitis groups differed significantly from the ulcer group in terms of character of body-image boundary responses. The arthritis and neurodermatitis patients, as compared to the ulcer group, gave significantly more responses emphasizing boundary impermeability. The neurodermatitis and arthritic groups gave significantly fewer responses emphasizing boundary permeability, in comparison to the ulcer group. Accordingly, the original postulations underlying the study were confirmed.

**Clifford, E.** *see* Ausubel, D. P.

**Clifton, Donald O.** (*University of Nebraska*) **A study of the relationships between certain characteristics of counselors and their ability to establish positive rapport.**

The purpose of this study was to develop a technique for measuring positive rapport between a counselor and a counselee and to attempt to discover char-

acteristics that distinguish between counselors who develop good working relationships and those who do not. The counseling that is carried on every fall as a part of the orientation course for all freshmen in Teachers College at the University of Nebraska furnished the frame of reference for this study. Two hundred and eight undergraduate seniors and 36 graduate students were the counselors. The counselees were 816 freshmen in Teachers College during the years 1950, 1951, and 1952. Sociometrics, standardized tests, biographical data, and interviews were used to collect information concerning the counselors. The analysis of the results made it necessary to use several statistical techniques such as analysis of variance, *t* test, correlation, and cluster analysis. The analyses gave evidence that rapport can be measured and that certain counselors who develop the best rapport possess characteristics that can be identified. The study would seem to indicate the need for further systematic identification of counselor characteristics as a means of improving counseling programs such as the one studied here.

**Cobb, Bart** *see* Barry, John R.

**Coburn, Herbert H.** (*Wayne University*) **An experimental comparison of relationship-centered and problem-centered counseling.**

**PROBLEM:** This research investigates the relationships between (a) client reactions to a first counseling interview, (b) three modes of counseling, and (c) three types of clients. The three modes of counseling are characterized as (a) relationship-centered, paternalistic, counselor-directed; (b) relationship-centered, equalitarian, client-directed; and (c) problem-centered, equalitarian, counselor-directed. Certain categories of counselor behavior were found to be invariably classified as uniquely characteristic of each of the three modes. The three types of clients are those who have felt needs corresponding to one or another of these three categories of counselor behavior.

**SUBJECTS:** 90 student teachers, ten for each experimental condition.

**PROCEDURE:** The mode of counseling was varied through the use of role-playing techniques in which student teachers, identifying with the client in his role, observed professional actors in standardized counseling situations. Instruments were developed for measuring the pertinent needs of clients. Comparison of the nine experimental conditions was made by obtaining scores on 16 indices which referred to relevant experiences which clients had previously been shown to have in the initial phases of counseling. Data were treated by analysis of variance and covariance in 3 X 3 factorial design.

**RESULTS:** Significant differences were obtained based upon both mode of counseling and type of subject. Subjects who received relationship-centered treatment scored higher on most indices regardless of their felt needs. Subjects whose felt needs characterized a preference for equalitarian counseling scored higher on most indices regardless of the mode of treatment they received.

**CONCLUSIONS:** Definite measurable and consistent differences are obtained in the reactions of clients of different types of needs to the same technique of counseling. Definite measurable and consistent differences are also obtained in the reactions of clients of the same needs to different techniques of counseling.

**Cohen, Burt** *see* Sakoda, James M.

**Cohen, David.** (*VA Hospital, Coatesville, Pennsylvania*) **Psychological concomitants of chronic illness: a study of emotional correlates of pulmonary tuberculosis, peptic ulcer, the arthritides, and cardiac disease.**

**PROBLEM:** To establish norms on the MMPI, Bell Adjustment Inventory, and Picture Frustration Test for veterans hospitalized for pulmonary tuberculosis, peptic ulcer, arthritides, and cardiac disease; to determine and explain significant differences between these groups, nondisabled veterans, and hospitalized psychoneurotics; to investigate relationships between test data, length of hospitalization, and severity of pulmonary tuberculosis.

**SUBJECTS:** 75 white, male veterans, aged 20 to 45 years, average intelligence or higher, were in each group except 100 Ss with tuberculosis. Cooperative visitors to the hospital served as controls.

**PROCEDURE:** Each experimental S was tested a short time after hospitalization. Significant MMPI scale differences between the groups were analyzed to determine whether they might be attributed to "health items"—to behavior limited by the disease with no inherent personality significance—and to items of "different interpretive significance." A group of medical practitioners reviewed each MMPI item to determine whether it is a "health" or "attitude" item. Two subscales were constructed for each scale and all groups compared therewith.

**RESULTS AND CONCLUSIONS:** 1. None of the scoring categories of the P-F test differentiated between any of the groups.

2. Severity of pulmonary tuberculosis has insignificant effect upon intellectual efficiency nor does it significantly effect the MMPI scores either singly or in combination with length of hospitalization.

3. There was a hierarchy of score levels with the psychoneurotic group scoring significantly higher on practically every scale, the combined chronically ill

group (arthritic and cardiac) next highest, the tuberculosis group next highest, and the control group lowest in practically every MMPI scale.

4. Specific significant scale differences were found between various groups except between the arthritic and cardiac groups.

5. Effect of "health items" cannot be overlooked in arbitrarily elevating MMPI scores.

6. Only the "health" and "total" scales of the Bell Inventory differentiated between the disability and control groups. (Slides)

**Cohen, Walter** *see* Goldberg, Shepard

**Collier, George** *see* Brackman, Jack

**Collins, Marjorie G.** (*University of Pittsburgh*)

**A study of parent attitudes on child management before and after training, utilizing the critical incident technique.** (Sponsor, John C. Flanagan)

**PROBLEM:** Because the critical incident by nature has internal validity as a manifestation of attitude, because the critical incident technique has proved amenable to rigorous statistical analysis, and because it has revealed significant differences in what is considered effective in diverse army and civilian occupational activities, the critical incident was adopted as the basic unit of data for the present study of what is considered effective in child management. Other measures used were a situational check list and a Likert-type questionnaire.

The null hypothesis was that there would be no significant differences in parent attitudes on child management before and after training as inferred from these measures.

**SUBJECTS:** The 17 mothers who attended the annual two-week training program for parents of hearing-handicapped preschoolers held at Camp Easter Seal, near Somerset, Pennsylvania in the summer of 1953.

**PROCEDURE:** Each mother was asked to furnish from her own management of her child 10 incidents she considered good and 10 she considered bad (*a*) for the week immediately preceding camp, and (*b*) for the final week of camp. Critical incidents reported by staff observers and situational check list and questionnaire data were collected at the beginning and again at the end of the training period.

For purposes of statistical analysis critical incidents were rated on a five-point scale for each of the eight basic parent behavior variables developed by Champney. Rating reliability was checked through partial replication by independent judges.

**RESULTS AND CONCLUSIONS:** Chi-square analysis of critical incident distributions before and after training showed differences significant at the .05 level or



better in all eight behavior variables based on staff report and in two of the eight based on mothers' self-report. The utility of the critical incident technique in the study of parent attitudes and in the appraisal of parent training is discussed.

**Collister, E. Gordon.** (*University of Kansas*) **A comparison of scoring the Strong Vocational Interest Blank for high school senior boys using group and occupational scoring keys.**

**PROBLEM:** It has been suggested that for high school senior boys scoring the SVIB on group keys is sufficient for considering broad educational and vocational areas. Many counselors are reluctant to use the scores on group keys only. This investigation examines the question of how many high scores on occupational keys are "missed" if SVIB answer sheets are scored on group keys only.

**SUBJECTS:** Two samples of high school senior boys: a sample of boys nominated for college scholarships ( $N = 513$ ) and a sample of all boys in 12 senior classes ( $N = 245$ ).

**PROCEDURE:** All of the answer sheets in each sample were scored on group and occupational keys. The distributions of letter grades for each sample on the group keys were compared. Tables were prepared showing the percentage of letter grades on each occupational key within a group for a given letter grade on the appropriate group key.

**RESULTS:** The papers from the two samples could not be combined since the distributions of letter grades differed significantly (.01 level) for groups II, V, VIII, and IX. For groups I and X the distributions did not differ. For the scholarship group a greater proportion of high letter grades was found in groups II and V, while for the nonscholarship group a greater proportion of high letter grades was found in groups VIII and IX. Tables are presented showing the frequency of occurrence of letter grades on occupational keys for each letter grade on each of the group keys for both samples.

**CONCLUSIONS:** In general, occupational keys in those groups for which an individual scores a C or C+ may be ignored when a counselor is concerned with broad educational and vocational plans. A similar statement may be made with respect to occupational keys in groups II, V, IX, and X for scores of B and B- on those group keys. Exceptions to these general statements are noted.

**Colmen, Joseph G., Fiedler, G. O., & Boulger, John R.** (*Headquarters, USAF*) **Methodological considerations in determining supervisory training needs.**

**PROBLEM:** In developing or revising any training program, need dictates content. As a basis for revising

the USAF supervisory training course which is intended for general use at all Air Force bases the questions to be answered were: (a) which is the most reliable source of information about supervisory training needs: the supervisor himself, his superior, or his subordinates, (b) which is the most reliable technique for eliciting the information: ranking of duties in terms of difficulty of performance or paired comparisons of duties with each other?

**SUBJECTS:** 45 group leaders (first level supervisors), 159 subordinates of these group leaders, and 45 superiors of these group leaders. A questionnaire was prepared based on a list of duties considered by experts to be basic to supervisory positions. The lists were fashioned for straight ranking as well as for paired comparison. The questionnaire was pretested for format, clarity, and coverage; revised; and then administered to the afore-mentioned sample.

**RESULTS:** 1. There is little agreement among group leaders about their training needs as a group; among their supervisors about the training needs of their group leaders as a group; or among subordinates about the training needs of their group leaders as a group.

2. For any one group leader, most agreement about his training needs was found between his supervisor and subordinates.

3. There was insufficient difference in the responses of "blue-collar" as against "white-collar" employees to warrant treating them as separate groups.

4. Respondents preferred the paired-comparison form to the ranking form.

**CONCLUSIONS:** (a) Superiors are recommended as the source of data concerning training needs of group leaders. (b) The paired-comparison technique is recommended as the method for eliciting the information.

**Corrie, C. C., Fogel, J., & Frank, G. H.** (*Florida State University*) **A critique on research with the Wechsler-Bellevue test in differential psychodiagnosis.** (Sponsor, G. H. Frank)

Although considerable research has been conducted to validate Wechsler's hypothesis concerning the use of the Bellevue in differential psychodiagnosis, no definite conclusion has been reached. However, the performance of "mental" patients on the test continues to suggest that emotional disturbance affects subtest performance in various ways. The writers hypothesized that some variable in the sampling techniques might account for the inconsistent results.

Current research appeared to validate this assumption. Numerous researchers included in their selection of a sample population wide ranges of intelligence, age, education, length of hospitalization, and even diagnostic categories. The writers felt that the a priori selection of a sample on the basis of

diagnosis alone, without controlling for other variables, constituted evidence of improper sampling techniques. In effect, then, the groups so selected did not constitute homogeneous groupings of subjects. This would be reflected in heterogeneity of subtest scores, hence initially confounding the results of the pattern analysis.

Out of the 22 diagnostically differentiated groups presented by Rapaport, 13 proved to be composed of *Ss* whose variance in subtest scores identified them as not coming from the same common population. This was true of the three diagnostically differentiated samples of *Ss* used by Cohen in a doctoral dissertation at NYU in 1950. Each of his three groups, neurotics, schizophrenics, and organics, proved to be from disparate variance populations. Samples of neurotics, schizophrenics, drug addicts, and manics, selected from different studies, all proved to be heterogeneous groupings of scores sampled from nonrelated variance populations.

In light of these data, the writers cannot see how the results of analyses on such samples constitute reliable or valid research.

**Cottle, William C., Wands, Herbert, Pownall, Jo E., & Barker, David P.** (*Guidance Bureau, University of Kansas*) **A scale to differentiate counselors from teachers.**

**PROBLEM:** Preliminary work has developed a pool of 150 items from the MMPI, Guilford-Zimmerman Temperament Survey, and Strong Vocational Interest Blank which will differentiate counselors from college-males-in-general. A pilot study has shown that 55 of these items will differentiate male teachers from male counselors. Now it is hoped in a larger study to develop scoring keys for male and female public school counselors which differentiate them from public school teachers.

**SUBJECTS:** A sample of 10 male and 10 female public school counselors recommended as competent by state supervisors in the 48 states versus a matching non-counseling teacher of the same sex from the same school. A sample of 134 most highly trained male counselors in the Province of Ontario versus a matching noncounseling teacher of the same sex from the same school. The matching teacher was to approximate the college credit and years of work of the counselor.

**PROCEDURE:** The counselors recommended by their state or provincial supervisor were asked to complete the 150-item scale and secure a matching teacher from their school to do this also. Then the counselors from each of the three groups (U. S. males, U. S. females, and Ontario males) will be divided randomly into two

subgroups and their answers to the 150 items contrasted by item analysis techniques with those of their matching teachers. The scoring keys constructed by use of the item analyses and phi coefficient will be double cross-validated on the two subgroups of each of the three groups, respectively.

**RESULTS:** At the time this abstract was submitted returns had been secured from 200 male U. S. counselors and matching teachers, 225 female U. S. counselors and matching teachers, and 100 male Ontario counselors and matching teachers. Statistical procedures are to begin April 25, 1954.

**CONCLUSIONS:** None possible at this time.

**Cotton, John W., & Jahnke, John C.** (*Northwestern University*) **The sum of squares ratio as a substitute for the variance ratio in analysis of variance.**

The authors propose that the computation of mean squares (or variances) and of their ratio (*F*) be omitted from the analysis of variance procedure. This is possible because the ratio (*S*) of two independent sums of squares obtained with the traditional procedure may be used as a basis for drawing statistical conclusions without any necessity of finding mean square or *F* values. The *S* obtained from data under analysis is compared with an *S* value required for significance at a specified level with the degree of freedom values appropriate to the situation. If the empirically obtained *S* exceeds the tabled value, the hypothesis in question is rejected; otherwise it is accepted. In either case the same conclusion is reached with *S* as would be obtained were *F* determined.

A table of *S* values required for significance at the 5 per cent and 1 per cent levels is presented. The method of constructing that table is described, and instructions for its use are given. The *S* test is recommended for use in any analysis for which *F* is commonly employed but should not be used unless the assumptions underlying the analysis of variance are fulfilled.

**Cox, Rachel D.** (*Bryn Mawr College*) **Personality dynamics of the well-adjusted college student as revealed by the Rorschach and Thematic Apperception tests.**

**PURPOSE:** The study aimed to make a contribution to the development of a normative picture or standard of the normal (well-adjusted) student.

**METHOD:** A threefold approach was developed as follows:

1. Psychological Evaluation: (a) Test of Scholastic Ability (b) Rorschach (c) Thematic Apperception Test

2. Psychiatric Evaluation: Psychiatrists saw each student for six two-hour interviews over a period of six weeks.
3. Family Background and Dynamics: A study of the family was made through a long home visit running on the average for two and a half hours.

**FINDINGS:** (a) Certain characteristic features of the Rorschach psychogram and content of the Rorschach and Thematic Apperception Test appear to be consistent in this normal group. These features distinguish them from students of comparable academic ability who are showing manifest difficulties in adjustment or learning. (b) The findings of both tests suggest that there is within the so-called normal personality more tolerance for deviate dynamics than has sometimes been thought. (c) Indications from early follow-up concerning the adequacy of the criterion of "normal" suggest the suitability of the criterion.

**Craig, David R., & Stroud, John M.** (*U. S. Navy Electronics Laboratory*) **A system for dynamic analysis of human control actions.**

Facilities for the dynamic analysis of the behavior of a human component in a control system have been designed, procured, and tested. The design of the facilities and of the projected research program are based on four main concepts: (a) The design of a control system defines the task of each component in the system whether the component be human or hardware; (b) a system is what it does regardless of the material of which it is made or the geometrical configurations which it may assume; (c) the task of a human component in a control system may be analyzed at three different levels, the function performed, the operations by which the function is performed, and the sensorimotor discriminations required by the operations; (d) descriptions of the behavior of human components to be useful must be couched in the same terms as those used for the other components and for the system as a whole.

These concepts determine the basic design of the facilities. Means must be provided for achieving task variation through the system variation. Only system dynamics need be represented. Numerous control and display combinations must be available to provide a variety of control operations. Considerable range in sensitivities of both the displays and the control devices must be provided in order to allow variation in the sensorimotor discrimination requirements. Measuring and recording instruments must be of the sort which permit the use of engineering methods of analysis. The extensiveness of records of this nature requires means for the rapid transformation and reduction of data.

These stated requirements have been met essentially

in the Manual Control Dynamics Facility at the U. S. Navy Electronics Laboratory. The research program will be focused on the determination of the transfer characteristics available in the human component and the means by which these characteristics may be achieved, and will eventually result in a handbook for systems designers in which data will be presented relative to the questions of how and when to use a human component.

Design details as well as the facilities themselves are available for use by those research workers who may be interested. (Slides)

**Crampton, George H.** *see* Armington, John C.

**Crannell, Clarke W.** *see* Christensen, Julien M.

**Crumbaugh, James C.** (*Memphis State College*) **Temporal changes in the memory of visually perceived forms.**

The Wulf effect, which assumes that temporally progressive changes occur in the memory trace of a previously perceived percept, has been a controversial issue for a generation; some experimenters have confirmed and some have negated it. The present experiments attempt to devise a methodology for settling the issue. The method chosen is the method of equal stimuli set up as a psychophysical experiment on the time error, in which the standard is reintroduced for each comparison of the variable. Five experiments were performed, one with each of five asymmetrical geometric designs: (a) a broken circle with 15° gap, (b) a tilted line, (c) the relative size of two disks, (d) an ellipse, and (e) a broken circle with 90° gap. The 285 Os were tested individually. The task was to observe a luminous figure flashed on one side of a fixation point on a milk-glass screen for 1/2 sec., and to compare it with a second figure flashed on the opposite side of the fixation point after a time interval. Actually the two were always equal, but O was told they differed in symmetry and was asked to judge this difference. The time intervals used were 0.0, 0.3, 2.0, 5.0, and 12.0 sec. The results of each of the five experiments showed statistical significance and confirm the gestalt hypothesis of temporally progressive memory changes. The time-error curves for each of the five figures are presented. Both quantitative and qualitative differences in the curves occur in the different figures. The positive results of these experiments in contrast to negative and uncertain results of other experimenters are attributed to choice of method and time intervals; suggestions for further study are offered.

This paper is adapted from a dissertation submitted in partial fulfillment of the requirements for the PhD degree at the University of Texas, June 1954.



Cuony, Edward R. *see* Hoppock, Robert

**D'Amato, May F., & Kendler, Howard H.** (*New York University*) **Reversal and nonreversal shift in human concept formation.**

**PROBLEM:** To determine whether or not the superiority of a reversal over a nonreversal shift in a card sorting test is independent of (a) partial reinforcement received by nonreversal Ss, and (b) the nature of the concept shifted to.

**SUBJECTS:** 101 undergraduate students.

**PROCEDURE:** Two experiments were conducted. In both, 32 response cards had to be sorted into two categories without reference to any stimulus cards. The S learned a first concept (shape or color) and was then shifted to a second concept. The shift was of a reversal (e.g., color to reverse color) or a nonreversal (e.g., color to shape) type. Control groups were employed which differed from the experimental groups only in that they had no training on a first concept.

In the first experiment partial reinforcement effects were controlled by introducing an extinction series between the learning of the first and second concepts. This provided 100% nonreinforcement for both first concepts. In the second experiment no extinction series was used.

**RESULTS:** The results were consistent with those recently reported by Kendler and D'Amato in that a reversal shift was found to be significantly superior to a nonreversal shift whether partial reinforcement effects were present or absent. Since in Kendler and D'Amato's study the nonreversal shift was to a reverse concept (e.g., reverse color), whereas in these studies the nonreversal shift was to a "direct" concept (e.g., color), the inferiority of a nonreversal shift was thus shown to be independent of the nature of the concept shifted to. The results are discussed in relation to the hypothesis tested, which conceives of card sorting behavior as consisting of two successive S-R associations, with a verbal response and the stimuli resulting from it mediating overt behavior.

This experiment was performed in connection with Project NR 150-064, under Contract NONR-187 (00) between the Office of Naval Research and New York University. (Slides)

**D'Amato, Michael R.** (*New York University*) **Transfer of secondary reinforcement across the hunger and thirst drives.** (Sponsor, Howard H. Kendler)

In the present investigation the role of the relationship between concurrent motivation (drive during testing) and antecedent drive-incentive conditions (during training) in secondary reinforcement was studied. In Exp. I, 96 rats were trained on a straight

alley while hungry and thirsty. Half of the Ss received a food reward and half received water. During subsequent testing for secondary reinforcement, the former goal box, minus the reward object, was located on one side of a T maze; a "neutral" box comprised the other end box. During testing one-third of each reward group was appropriately motivated (hungry if Ss had been food rewarded, thirsty if water rewarded); one-third was inappropriately motivated (hungry if Ss had been water rewarded, thirsty if food rewarded); and one-third of each group was motivated by both drives. The appropriately and "both" motivated groups responded to the side of the T maze on which the former goal box was located in excess of chance expectancy ( $p < .001$ ). Whereas the inappropriately motivated group failed to exceed chance performance, the W(H) subgroup (trained with water reward and tested hungry) exhibited a trend in this direction ( $p = .085$ ). In Exp. II this trend was checked: 16 Ss were trained hungry and thirsty, received a water reward, and were tested while hungry. A significant preference for the side of the T maze on which the former goal box was located emerged ( $p < .01$ ); it was therefore concluded that a secondary reinforcer can have effect even when Ss are inappropriately motivated.

Experiment III was devoted to determining whether or not the presence of the inappropriate drive during training was a necessary condition for transfer of secondary reinforcement across drives. Twenty Ss were trained while thirsty only, received a water reward, and were tested while hungry only. Secondary reinforcement was again in evidence ( $p < .002$ ). Finally, in Exp. IV 20 Ss were trained while hungry only, received a food reward, and were tested while thirsty only. Once more secondary reinforcement manifested itself ( $p < .001$ ). The results are interpreted as being in opposition to the drive-reduction conception of secondary reinforcement.

**D'Amato, Michael R.** *see* Kendler, Howard H.

**Dahlstrom, W. Grant.** (*Department of Psychiatry, University of North Carolina*) **Prediction of adjustment after neurosurgery.**

Sixty-five patients (20 females) in University Hospital at the State University of Iowa were tested with the Wechsler-Bellevue Intelligence Test, Verbal Scale, and the MMPI as part of the preoperative neurosurgical evaluation for herniated intervertebral disc. A prediction was made for each case of his probable reaction to surgery and his postoperative course based on the test findings. The cases were followed up for evaluation of their adjustment to the surgery and capacity to resume their premorbid activities. Twenty cases were not operated on. The

predictions correlated +0.43 with the decision that the symptoms of the case were not on an organic basis. For the 26 cases on whom adequate three-month follow-up information was available, the prediction of outcome correlated with subsequent course +0.83. This is statistically significant at the 1% level. An analysis was made of the variables involved in the prediction: interjudge agreement on prediction from the test data; relationships of the separate test variables to the predictions; patterns of MMPI scores in the various outcome groups. A subsequent scoring for Hanvik's Functional Low Back Pain Scale on the MMPI showed a restricted range in this largely organically based group, but the scale correlated -0.36 with predictions and -0.20 with outcome. The personality measures used appear to be a highly useful set of predictors for the identification of neurosurgical cases who react poorly to the operation or continue to suffer from handicapping symptoms after the structural difficulties are surgically corrected. (Slides)

**Dai, Bingham. (Duke University) Intensive personality study as a method of training in psychotherapy.**

As a part of the training in psychotherapy for residents in psychiatry and medicine and for graduate students of clinical psychology, a 3-month intensive personality study course has been tried since 1947. This is a preliminary report of this training experiment.

**PROBLEM:** To find out to what extent a 3-month course of training in self-knowledge can help a student in the following ways: (a) to attain insight into his own emotional development and current problems of living; (b) to increase his understanding of psychodynamics; and (c) to enhance his ability to work with patients.

**SUBJECTS:** 50 students have completed the course, but only 24 are included in this report. Among them are 17 residents in psychiatry, one fellow in medicine, and six graduate students of clinical psychology.

**PROCEDURE:** The course consists of 36 didactic interviews. The procedure followed is essentially psychoanalytic, but the emphasis is placed on the student's current interpersonal relations instead of his infantile experiences and on the facts of emotional life instead of theory. And the trainer was completely free of any administrative or disciplinary duties involving any of the students.

**RESULTS:** Each student was asked to take a Rorschach test before the training and another afterwards. The Rorschach protocols with names removed were analyzed by an outside specialist, and the interview records were reviewed by the writer. According to

both sets of data, 20 out of 24, or 84%, showed either marked, or some definite, changes for the better, in areas to be specified in the paper. Four, or 16%, showed either little or no significant change.

**CONCLUSION:** The results of this experiment indicate that a 3-month intensive personality study, if conducted properly, could be a useful and integral part of a comprehensive program of training for psychotherapists.

**Darbes, Alex J. (Cleveland State Hospital) Development of a Q-Rating Scale of Ward Behavior of hospitalized psychiatric patients.**

In the psychiatric hospital, the description of patients' behavior is basic to diagnosis, prognosis, and the prescription and evaluation of treatment procedures.

Various behavior rating scales relying on traditional check-list thinking have been devised. These scales although proving useful in limited situations as gross differentiators depend upon the rater's opinion of each particular statement isolated from its relationship to all other statements about behavior.

Stephenson's *Q* technique forces the rater to consider a given item in a sample in relationship to every other item. This is a more meaningful, pattern-like approach to the problem. A structured *Q* sort based upon 4 major areas of personality was constructed using items representing an adequate sample of ward behavior. These areas were of psychological structure (id, ego, superego), psychosexual development (oral, anal, phallic), interpersonal relationships (self, peer, authority), and libidinal vector (action towards the patient and action from the patient towards others). The interaction of the variables ( $3 \times 3 \times 3 \times 2$ ) resulted in a 54 item *Q* sort, each item reflecting a different combination of the 4 variables. For example, one item would represent the combination of id, oral, self, and action towards the patient. Eleven professional judges rated each item as to its fitness within its designated cell in the matrix. Judges agreed 80% or better on the placement of each item in a given cell.

Psychiatric aides described the patients by placing the items into a forced-choice quasi-normal distribution in a continuum from most descriptive to least descriptive of the patients' behavior. A total of 80 ratings was obtained in various research projects. Revisions of questionable items were made after appropriate computations of analysis of variance, intra- and interrater reliabilities, and item analysis. The present *Q*-Rating Scale of Ward Behavior was the result of this work.

**Davis, R. C. see Buchwald, A. M.**

**Davis, Roger T. see Grodsky, Milton A.**

Delgado, J. M. R. *see* Roberts, Warren W.

Deutsch, Morton. (*New York University*) **The effects of past experience of success or failure, the perceived attitudes of other members, and the probability of goal attainment upon member attitudes and group performance.**

**PROBLEM:** The study herein reported focuses upon the member's desire to work with his group, his sense of team spirit, his willingness to exert himself, his feelings of responsibility to the group, and upon the actual group achievements as they are influenced by the following three variables: (a) the probability of goal attainment through group effort; (b) the past experience of success or failure as a group; and (c) the perceived attitudes of other group members toward participating in the group.

**SUBJECTS:** 72 experimental groups with three airmen in each.

**PROCEDURE:** The 72 groups were randomly assigned to eight experimental conditions which were created by combining the three experimental variables in a  $2 \times 2 \times 2$  factorial design. The experimental variables were created in the following manner: (a) The "low probability" groups were told that only one out of ten groups would be rewarded; the "high probability" groups were told that nine out of ten groups would be rewarded. (b) The "success" groups were told they had performed very well on a "group intelligence" test; the "failure" groups were told they had performed very poorly. (c) The "perceived favorable attitudes" groups were given notes, ostensibly from other members of their group, expressing enthusiasm about participating in the group; the "perceived unfavorable attitudes" groups were given notes expressing disinclination to participate.

**RESULTS AND CONCLUSIONS:** "Strength of membership motive" as reflected in the member's "desire to leave or stay," his "interest in the tasks," his "felt obligation to others," and "amount of effort contributed to the group" was positively and consistently related to the initial experience of success as a group and to the perception of favorable attitudes in other group members, but not strongly related to probability of goal attainment. None of the three variables significantly influenced group achievement.

Diamond, A. Leonard (*Northwestern University*), & Gilinsky, Alberta S. (*Columbia University*) **Dark-adaptation luminance thresholds for the resolution of detail following different durations of light adaptation.**

**PROBLEM:** The principal question investigated is concerned with how visual acuity, or the capacity of the eye for the resolution of visual detail, changes during dark adaptation. It has been found in previous ex-

periments that this capacity generally improves during dark adaptation, and further, that the course of this improvement depends upon the luminance of the adapting light preceding dark adaptation. The present experiment is specifically concerned with the duration of the preadapting luminance, since this parameter has not been systematically explored with respect to visual acuity during dark adaptation. Another related parameter that is investigated is the acuity value, or fineness of detail, of the object discriminated during dark adaptation.

**METHOD AND PROCEDURE:** The apparatus used is a modified Hecht-Shlaer adaptometer enabling determination of acuity thresholds during dark adaptation.

A modified psychophysical method of constant stimuli was used to determine the acuity thresholds during dark adaptation. This dark-adaptation function was then studied for four values of light-adaptation duration (1 sec., 30 sec., 5 min., and 10 min.), and for three acuity values of the gratings that were used as acuity objects (0.042, 0.083, and 0.62).

Data were collected for two Ss of normal vision.

**RESULTS AND CONCLUSIONS:** 1. At all acuity levels, the initial thresholds rise, and the speed of dark adaptation decreases as duration of preadapting light increases from 1 sec. to approximately 5 min.

2. At lower acuities, 0.083 and 0.042, an additional effect occurs as a function of duration. The shorter the period of light adaptation, the less prominent is the primary cone dark adaptation, and the sooner does the rod dark adaptation appear.

3. As the level of acuity increases, the threshold luminance also increases, depending upon the amount of change in acuity and the preadapting duration. (Slides)

Dickinson, Robert *see* Bakan, Paul

Di Mascio, Alberto *see* Boyd, Richard W.

Dittman, Allen T. *see* Harway, Norman I.

Dorsey, Robert, & Bell, Graham B. (*Louisiana State University*) **Some empirical results of the application of Bender and Hastorf's correction of raw empathy scores.** (Sponsor, Graham B. Bell)

It is generally recognized that empathy scores are contaminated by projection, identification, and other as yet unidentified factors. In an attempt to remove some of these extraneous factors, Bender and Hastorf have devised a correction factor which when applied to the raw empathy scores will remove that portion of error in the total score which is attributable to projection.

One may choose to question the logical or statistical validity of such a correction; however, the final



usefulness of any such hypothesis must lie in the increased effectiveness of the tool in predicting behavior or refining concepts.

Seventy-two students were organized into initially leaderless discussion groups. The students were allowed to interact for 20 minutes by discussing a problem in human relations.

At the end of the session Ss' empathic ability was measured by a Dymond-like empathy test. Raw empathy scores were derived in the usual way. Bender and Hastorf's correction factor was then applied to the raw empathy score. In order to make the data more comparable, all the intratest correlations previously reported by Bender and Hastorf were computed for this population. In addition, a comparison was made between the correlations between raw empathy and scores on the Kerr Empathy Test, Leadership, Accuracy of Self Perception, and How Supervise Test and correlations between refined empathy scores and these same tests.

The repetition of Bender and Hastorf's procedures yielded confirmatory results. All the correlations were significantly different from zero and in the predicted direction.

However, when an attempt was made to relate the refined empathy scores to other factors to which empathy might be related—other empathy scores, leadership, accuracy of self-perception, and how to supervise—no significant relationships were demonstrated. In fact, whereas there were trends in the appropriate direction using raw empathy scores, these trends are reversed when the refined empathy scores are used.

Question is therefore raised as to the usefulness of this technique for measuring empathic ability, as empathic ability is defined by others.

Doyle, John J. *see* Beck, Lloyd H.

Dreyer, Albert *see* Sigel, Irving

Dudek, Stephanie (*New York Medical School*) & Gottlieb, Sophie. (*Post-Graduate School of Psychotherapy*) **An approach to fundamental compatibility in marital couples through the Rorschach.**

**PROBLEM:** This is a preliminary approach, by means of the Rorschach method, to the problem of fundamental compatibility between marital couples, i.e., persons who choose each other to live together and relate to each other in a meaningful and reasonably permanent relationship. The definition of fundamental compatibility is as follows: Fundamental compatibility is the ability to understand, communicate with, and accept each other on the level of the least changeable aspects of one's personality, with the same de-

gree of complexity. In Rorschach terms, this means compatibility between the *M* responses of each partner.

**SUBJECTS AND RESULTS:** The present research is a report on the *M* responses of 33 unhappily married couples, who, in spite of friction ranging from mild to severe, agreed to maintain their marriages. Analysis of *M* reveals a basic quantitative similarity in 24 of the 33 couples, i.e., only 27.2% show a discrepancy in the number of *M* to place them on different levels of psychic complexity. A control group of 21 persons, of the same general age and socioeconomic level, chosen as a random sample of males and females, show a disagreement of 66.7%, i.e., only 7 out of 21 had quantitatively similar *M*. Qualitative analysis of 10 cases of the experimental group shows a basic similarity in quality of *M*, i.e., if one mate had predominantly passive *M*, the quality of the other mate's *M* was not significantly different. A secondary finding was that the number of *W* responses showed an even greater quantitative similarity in the records of married couples than *M*. Of the 33 cases, there was only 21.2% disagreement between number of *W* sufficient to indicate a different degree of drive or ambition. The control group showed a 62% disagreement.

Duncan, Carl P. (*Northwestern University*)  
**Transfer after ten days of constant or varied training.**

The purpose was to compare transfer performance after practice on one task (constant training) and different tasks (varied training). In this first experiment all groups were trained 10 days before testing for transfer. The apparatus provided a paired-associate perceptual-motor situation where responses were movements of a lever into 13 slots and stimuli were nonsense figures presented on a memory drum. Different sets of stimuli provided different tasks. The Ss were 109 male and female undergraduates, assigned to three groups. Group I (constant training) practiced the same task throughout the 10-day training period. Group II (varied training) practiced a different task each day. Group III used another type of varied training in which the same stimuli were paired with the responses in a completely different order every day. Tests for transfer were made on two days following training with two new sets of stimuli (transfer tasks). On each transfer day half the Ss in each group were tested with each transfer task.

The results were: On the first transfer day Group II performed significantly better than Group I on both tasks, but Group III exceeded Group I on only one task. On the second transfer day differences among groups were greatly reduced, largely because of gains made by Group I. Group I was some-

what inferior to both varied training groups on one task, but on the other task all groups performed alike. It was concluded that varied training may yield transfer superior to that produced by constant training in some cases but not in others, and that even if better transfer is found it may be of relatively short duration. (Slides)

Duncan, Carl P. *see* Lewis, Donald J.

Dunn, Michael, & Lorge, Irving. (*Teachers College, Columbia University*) **A gestalt scale for the appraisal of human figure drawings.**

**PROBLEM:** Drawings of the human figure have been appraised in terms of specific items not only for the evaluation of intelligence but also of personality. Since the current orientation to the drawing of the human figure is that it be appraised on a holistic basis, an attempt was made to develop a product scale for the evaluation of the maturity of human figure drawings as a total representation.

**SUBJECTS:** The drawings were collected from 139 normals and 50 deviants in the age range 5 to 20.

**PROCEDURE:** Each child drew a picture to the verbal instruction "draw a boy if you are a boy, draw a girl if you are a girl," and then to the verbal instruction "draw a picture of yourself." The 378 drawings were placed in rank order for maturity from low to high by two psychologists and two art teachers independently with an over-all correlation in excess of .9. The drawings were reranked within sex and every fifth per cent position drawing selected to form the scale.

**RESULTS:** The corresponding product scale was used as a basis of evaluating approximately five thousand drawings with an interjudge reliability of approximately .9. The correlations between the product-scale appraisal and estimates of intelligence are substantially high suggesting the applicability of the holistic product scale for the appraisal of intellect as evidenced in the maturity of representation. Since a qualified rater can appraise about 100 drawings per hour, the obvious efficiency of the procedure is indicated.

Dunn, Michael B. *see* Lorge, Irving

Dunn, Theodore F., Bornstein, Harry, Jensen, Barry T., & Tye, Vermont M. (*Personnel Research Branch, The Adjutant General's Office*) **A group-administered performance test of Army basic military skills.**

**PROBLEM:** Performance testing in Army basic military subjects has suffered from the following inadequacies: (a) nonstandard administration and scoring tending to lower reliability; (b) uneconomical individual testing procedures resulting in excessive demands for testing personnel, equipment, and time; and (c) undue

utilization of verbal items yielding spurious correlations with paper and pencil predictors. This paper describes an attempt to develop more adequate performance measures of basic military skills.

**TESTING TECHNIQUES:** The focal point of the testing techniques for each of 13 performance stations (comprising the total test) is a 10 in.  $\times$  16 in. all-weather testing board. This board contains (a) a general description of the performance to be tested, (b) an equipment list, (c) a layout diagram of the testing station, (d) standard testing procedures, (e) scoring mechanics, (f) the testing script to be used by the examiner, (g) scoring standards, and (h) a provision for special IBM scoring. The script specifies *exactly* what the tester is to do and say. Check-list scoring standards minimize the judgment required of the examiner.

**EVALUATION OF TECHNIQUES:** Employment of these techniques yielded information on the following characteristics of the test:

1. Objectivity: The mean of the interscorer reliability coefficients for the 13 performance stations was .80 (the number of examinees averaged 205). The total test-retest reliability was .67.

2. Economy: Each test station is arranged to simultaneously test 14 men in 12 to 15 minutes. Sixteen testers administer the test to 182 men in approximately 4 hours. Operationally, 13,000 men have been tested with this instrument in approximately 384 hours.

3. Verbal characteristics: The correlation of the Reading Vocabulary Test of the Army Classification Battery with the performance test of basic military skills was .29 as compared to a correlation of .76 between the Reading Vocabulary Test and a paper and pencil test of basic military skills. (Slides)

Dunn, Theodore F. *see* Bornstein, Harry

Durkee, Ann, Buss, Arnold H., Wiener, Morton, & Baer, Marc. (*Carter Memorial Hospital, Indianapolis*) **The measurement of anxiety in clinical situations and its relationship to the Taylor anxiety scale.**

**PROBLEM:** The lack of general agreement among measures of anxiety in clinical situations may be attributed to vagueness in describing the manifestations of anxiety. This study attempted to specify the manifestations of anxiety and to determine if this specificity resulted in higher reliability of measurement. Also, the evaluations of clinical anxiety were compared with scores on the Taylor anxiety scale.

**SUBJECTS:** 73 patients in a neuropsychiatric hospital. **PROCEDURE:** Each S was interviewed by a psychologist, with three other psychologists present. The four psychologists rated various aspects of anxiety on a

five-point scale. After the interview, the Taylor anxiety scale was administered.

The manifestations of anxiety were grouped into 8 categories: (a) observed behavior—distractibility, restlessness, and physiological concomitants; (b) reported by S—subjective feeling of tenseness, worry, somatic complaints, physiological concomitants, and restlessness and muscular tension. In addition there was an over-all rating of anxiety.

**RESULTS:** The mean intercorrelation among judges for the over-all rating of anxiety was .83. The mean intercorrelations among judges for the eight categories of anxious behavior ranged from .56 to .93.

Next, the ratings of the four judges for each S were pooled. Correlations between pooled ratings of over-all anxiety and each category ranged from .47 to .72; between over-all anxiety and the Taylor scale,  $r = .60$ ; between individual categories and the Taylor scale,  $r$ 's ranged from .16 to .68. Finally, the pooled ratings for each category were summed. The correlation between these arithmetic sums and the over-all ratings of anxiety was .93.

The effect of specifying the manifestations of anxiety on interjudge agreement and the adequacy of the Taylor anxiety scale in measuring clinical anxiety are discussed.

**Dusek, E. Ralph.** (*Headquarters Quartermaster Research and Development Command, Natick, Massachusetts*) **Facilitation and interference in the performance of simplified tasks on the Modified Mashburn Apparatus.**

The purpose of the present experiment was to study proactive and retroactive facilitation and interference effects using five simplified tasks on the Mashburn apparatus. The tasks differed in stimuli and/or responses (controls) or in stimulus-response relationships. Each of eight groups, 10 Ss per group, trained on two of the five tasks. A group performed on one task during OL, another during IL, and on the first task again during RL. Pairs of groups trained on the same two tasks in different order.

The measures used were matches and error scores. Proactive effects were analyzed primarily by comparing performance measures for the first IL and OL trials on a task. Retroactive effects were revealed by comparing changes in measures from the last trial of OL to the first trial of RL.

**RESULTS:** 1. Proactive interference effects occurred only in the two groups performing on tasks having reversed controls. These groups also showed the largest amount of retroactive interference.

2. When groups performed on tasks differing in stimuli, slight and consistent proactive facilitation effects were found. Retroactive effects for these

groups were inconsistent. The experimental design presumably limited the possibility of detecting the presence of retroactive facilitation.

3. When groups performed on tasks differing in controls or both in stimuli and controls, proactive as well as retroactive effects were negligible.

4. Differences in difficulty of tasks may have confounded the results. (Slides)

**Edgerton, H. A., & Feinberg, M. R.** (*Richardson, Bellows, Henry & Co., Inc., and the Bernard Baruch School of Public and Business Administration*) **An analysis of test procedures for the selection of supervisors.**

**Edgerton, H. A.** *see* Zalkind, S. S.

**Edwards, Ralph V.** *see* Gottsdanker, Robert M.

**Edwards, Ward.** (*Johns Hopkins University*) **A model for predicting gambling decisions.**

**PROBLEM:** Economists and psychologists have used the concept of the utility or subjective value of money to account for choices among bets. The theory of games includes the notion that people choose among bets as if they were maximizing expected utility. Recent experiments make it seem likely that people maximize what might be called *subjectively expected utility* (SEU), which is calculated by weighting the utility of each possible outcome of a bet by its subjective probability and summing these weighted utilities. This experiment was designed to test this hypothesis.

**SUBJECTS:** Five Johns Hopkins male undergraduates. **PROCEDURE:** Ss were required to choose between pairs of bets having constant probabilities. From the indifference points determined from these choices, an interval utility scale was constructed for each S. The results of other choices and these utility scales were used to determine interval subjective probability scales. Then the utilities and subjective probabilities were used jointly to predict choices on yet another different set of bets. Each S was run about 40 hr. Seven independent determinations of utility scales and three independent determinations of subjective probability scales were made for each S; each determination by a different method. All gambling was done on surreptitiously rigged gambling machines for real money. In general, the method of constant stimuli was used; however, some data were collected by the method of adjustment.

**RESULTS:** The SEU maximization hypothesis predicted choices significantly better than chance for all Ss. The greater the difference in SEU between two bets, the more probable it was that the predicted choice would occur. Great variability was found in



individual utility scales, both from person to person and for the same person from one time to another.

**CONCLUSIONS:** The results of this experiment, though they do not establish the SEU maximization hypothesis as correct, do encourage its further experimental use. (Slides)

**Efron, Herman Y.** (*VA Hospital, Louisville, Kentucky and New York University*) **Factors in the learning of the galvanic skin response.**

**PROBLEM:** Previous investigations on conditioning of the GSR have reported a low percentage of Ss who conditioned. In one study, no more than 40% of Ss exhibited a conditioned GSR, whereas in comparable experimental situations utilizing the eyelid response 70 to 80% of Ss exhibited a conditioned eyelid response. The present experiment attempts to specify some factors that are concomitant with the learning of the GSR.

**SUBJECTS:** 100 male and female students from elementary psychology classes.

**PROCEDURE:** The CS consisted of a 4-sec. period of music recorded in such a way that there were four static-like interruptions during the first 2 sec. This CS was embedded in a matrix of other 4-sec. periods of music. The US was an electric shock to S's left wrist. The intensity of the shock depended upon S's tolerance; its duration was .65 sec., and its onset coincided with the termination of the CS. An exosomatic technique for recording the GSR was used, and the entire presentation was electronically controlled.

On the basis of 14 conditioning trials, the 100 Ss were divided into two groups. Twenty-four Ss met the criteria for "conditioners" and 24 met the criteria for "nonconditioners."

**RESULTS AND DISCUSSION:** Significant differences between the groups were found on the initial resistance level ( $p = .05$ ), the amount of decrease in the UR in 2 sec. ( $p = .01$ ), and the awareness of the pairing of the CS and the US ( $p = .001$ ). No significant differences were found between the level of conditioning and the intensity of shock. Intensity of shock was related to the initial level of resistance.

The results are discussed and interpreted as being consistent with a drive-reduction reinforcement theory of learning, and not consistent with the contingency notion of autonomic conditioning.

**Eichler, Herbert, & Gurvitz, Milton S.** (*Hillside Hospital*) **Research possibilities of the variance in the stimulus value of different editions of the Rorschach ink blots.** (Sponsor, Milton S. Gurvitz)

**PROBLEM:** In a preliminary paper it was demonstrated that inexact reproduction resulted in the older Rorschach cards being able to stimulate increased

color and shading responses. The present paper will examine the effect on a complete range of Rorschach variables with their implications on Rorschach theory and the unique utilization of this differential effect as a research tool.

**SUBJECTS:** 100 psychiatric patients.

**PROCEDURE:** The population was divided into four groups of 25 patients each (A, B, C, D). The newer blots are designated as I and the older cards as II. I was administered first and II second to Group A; II first and I second in Group B; I twice in C; and II twice to D. Chi square was used in treating our data with Yates's correction for continuity.

Seventeen Rorschach factors were compared.

**RESULTS:** Mere repetition of the cards did not produce significant differences in any of the factors investigated. There were significant chi-square differences in respect to  $CF$  &  $C$ ,  $Fc$  &  $cF$  &  $c$ ,  $k$  &  $kF$  &  $Fk$  &  $K$  &  $KF$ ,  $FC'$  &  $C'F$  &  $C'$ , color and shading shock, all in favor of the old cards. There were no significant chi-square differences in all the other factors investigated.

**CONCLUSIONS:** Except for  $FC$ , color and shading responses are a function of the intensity and richness of the color and shading qualities of the blots, while movement, form, and approach are not so affected.

In view of the stability of the records when the same cards are presented after a short interval, we can test out hypotheses concerning the rationale and meaning of color and shading responses by utilizing the subtle but measurable differences between the two sets of cards.

**Eisman, Eugene** (*University of California, Riverside*), & **Maltzman, Irving** (*University of California, Los Angeles*) **Serial rational learning under two kinds of anxiety.**

**PROBLEM:** The relationship between certain personality variables and problem solving was investigated. A rational learning problem conforming to Hull's schema for heterogeneous, compound trial-and-error learning was studied as a function of 3 levels of manifest and 2 levels of induced anxiety. An attempt was made to apply principles derived from the relatively simple trial-and-error learning to the complex rational learning situation.

**SUBJECTS:** Three groups of beginning psychology students were drawn from among those scoring in the highest, middle, and lowest 10% of the distribution on Taylor's Manifest Anxiety Scale.

**PROCEDURE:** For the test of rational learning, Ss were required to learn which of the numbers 1 through 10 were paired with each of the letters A through J. Since a given number was always associated with the same letter, the range of successive guesses was

limited by the rational organization of the problem imposed by S. Each anxiety group was divided, randomly, into threat and no-threat subgroups, which constituted the two levels of induced anxiety. Electrodes were attached to the palms of the threat Ss, who were told that shock would follow certain of their errors. They were never shocked, however. These instructions were omitted for the no-threat group.

**RESULTS:** First-choice, total, antedating, and perseverating errors were analyzed. The data were further analyzed in terms of the serial position and the Vincentized learning curves. Statistically significant differences were obtained indicating superior learning for the low followed by the high and then the medium anxiety groups. The threat subgroups were insignificantly superior to the no-threat groups.

**CONCLUSIONS:** With certain exceptions, the Vincent curves, the point-by-point analysis of the interference effects in the serial position curves, and other response measures were in line with the predictions from Hull's theory. The poor performance of the medium relative to the high anxiety group was unexpected and contrary to theory. In general, however, the principles derived on a lower level afforded valid prediction, within limits, in the more complex situation investigated in this study. (Slides)

Eisman, Eugene *see* Maltzman, Irving

Ellis, Robert A. *see* Logan, Frank A.

**Embree, Royal B., Jr.** (*University of Texas*) **The assessment of counselor competence through the use of multiple ratings by training supervisors and fellow students.**

**PROBLEM:** (a) To develop a system for rating students in a counselor-training program; (b) to study the behavior of ratings and of raters; (c) to determine the reliability and validity of ratings; and (d) to study the relationships between ratings and measured characteristics of these students.

**SUBJECTS:** 130 graduate students who were enrolled in counseling practicum during a two-year period.

**PROCEDURE:** Students were rated by two supervisors within each of four carefully described areas: (a) general proficiency in the counseling process; (b) effectiveness in relationships; (c) emotional stability; and (d) all-around effectiveness as counselors.

A sorting process patterned after the *Q* technique was used as the method of rating by supervisors. The names of practicum students were sorted along a continuum from weakest to strongest within each of the above categories and resorted after six months.

Peer ratings within the categories were based upon the ranking of all students in each practicum class by several members of the group.

Reliability coefficients were determined for the ratings. The general behavior of ratings and raters within each area of competence was studied. Partial validations of the ratings were established. Students rated as weaker and stronger were compared in terms of scores made on such measures as the Miller Analogies Test and the Minnesota Multiphasic Personality Inventory.

**RESULTS:** The most reliable and significant findings were obtained from the global rating. The proficiency rating was also quite stable and seemed to be the principal component of the global rating. Supervisors agreed much less well in sorting for effectiveness of relationship and rather poorly in sorting for emotional stability. Peer ratings were consistent with those of supervisors in most cases. Significant differences were discovered between groups of students rated as weaker and stronger in terms of the areas of competence.

**Epstein, Seymour.** (*University of Massachusetts*) **Unconscious self-evaluation in schizophrenics and normals.**

**PROBLEM:** To investigate unconscious self-evaluation in "normals" and schizophrenics by obtaining their judgments of their disguised expressive movements.

**SUBJECTS:** 30 delusional schizophrenics and 30 physically ill patients matched on sex, veteran status, institutionalization, age, and education.

**PROCEDURE:** Ss rated on graphic scales how much they liked or disliked people from disguised samples of their expressive movements. They were unaware that some of the expressive movements were their own. (In three cases where recognition took place, the data were discarded.) A further measure consisted of a tachistoscopic presentation of four first names, including S's own. This measure was based upon the assumption that the more one valued himself, the more readily would he perceive his name, a symbol of the self. All measures were expressed in terms of S's rating of his sample minus the average rating by others of the same sample. After the ratings for favorableness, all samples were presented once more, and Ss rated how similar they believed each was to their conception of their own. Finally, introspective judgments were made as to how well one liked his expressive movements, name, and self, thereby providing a measure of conscious self-evaluation.

**RESULTS:** (a) Unconscious self-ratings were significantly more favorable than ratings by others. (b) Conscious self-ratings were relatively objective. (c) Similarity was recognized to a significant degree despite a failure of identification. (d) Schizophrenics rated themselves significantly more favorably than controls on the unconscious measures of self-evaluation.

tion. (e) Schizophrenics rated themselves no differently from controls on the conscious measures of self-evaluation. (f) Schizophrenics were significantly less able than controls to identify self-relatedness in their expressive movements.

**CONCLUSIONS:** The findings suggest that moderate unconscious self-overvaluation is normal, but that beyond a certain point it is associated with pathology. Insofar as one can generalize from the schizophrenics in this sample, schizophrenia is associated with unconscious narcissism which may not be evident in overt behavior. An inability to identify self-related cues may explain the characteristic lack of insight in these patients.

**Eron, Leonard D. (Yale University) The relationship between cynicism, humanitarianism, and anxiety in medical students.**

It has been observed that medical students as a group tend to be more cynical and less humanitarian than would ordinarily be expected of a group who have chosen such a service-oriented profession for their life's work. It is hypothesized for the purposes of this study that the cynicism which has been observed operates as a defense against the anxiety engendered by the traumatic nature of the subject matter with which medical students must deal, and as a result they lose much of the humanitarian motivation with which they entered the study of medicine. The following predictions were made: (a) senior medical students will have more anxiety than freshmen, and will also be more cynical and less humanitarian; (b) those students who are most anxious will be less humanitarian and more cynical than the least anxious students; (c) the students' specialty choice will be related to the interaction of these three variables; (d) all results will be more consistent for seniors than for freshmen.

The Ss were 60 seniors and 78 freshmen at the Yale School of Medicine and 90 undergraduate students at Yale College. All Ss were volunteers. The medical school Ss constituted virtually 100% samples of their respective classes. All Ss were administered scales of humanitarianism and cynicism constructed for the purposes of this study and the Sarason Scale of Manifest Anxiety. The reliability and validity of these scales for this sample were established.

All results were in the predicted direction, most of them at significant confidence levels. The most striking findings had to do with specialty choice. The implications for medical education and more definitive research are indicated. (Slides)

**Eron, Leonard D. see Auld, Frank, Jr.**

**Estes, W. K. (Indiana University) Analysis of the relation between amount of reinforcement and rate of conditioning in a bar-pressing situation.**

Disparate relationships between rate of learning and amount of reinforcement have appeared in the runway and bar-pressing situations. In the former case, rate of learning varies directly with amount of reinforcement whereas in the latter case the function is nonmonotonic with a maximum at an intermediate value of the amount variable. The present study represents an attempt to resolve this problem by analyzing rate of bar pressing into two component measures.

Six rats were given 100 reinforced trials a day in a Skinner box under the following conditions of reinforcement: Days 1-6, 32% sucrose solution; Days 7-14, 4%; Days 15-17, 32%; Day 18, 4%. Durations of bar-pressing responses and intervals between bar-pressing responses were measured to the nearest .1 sec.

Results in terms of over-all rate were anomalous from the viewpoint of reinforcement theory. Rate increased upon the first shift to 4% solution, decreased upon the shift back to 32%, and again increased upon the final shift to 4%. The interval and duration measures both yielded decreasing functions of similar form over the first six days; then the curves parted company. The intervals decreased on 4% and increased on subsequent 32% series, while the durations increased on 4% and decreased on 32%; all of these effects were uniform and statistically reliable.

If duration of the bar response is regarded as latency of magazine approach, the relationships obtaining in the bar-pressing situation are brought into line with those previously established for the maze and runway. In each case it is the organism's tendency to approach the reinforcing stimulus that varies in a simple and direct manner with amount of reinforcement. However the rate measure in the bar-pressing situation is complicated by effects of competition between bar-approach and magazine-approach tendencies. (Slides)

**Estes, W. K. see Lauer, D. W.**

**Evans, Richard I., Roney, H. Burr, & McAdams, Walter J. (University of Houston) An evaluation of the effectiveness of instruction and audience reaction to programming on an educational television station.**

**PROBLEM:** With the beginning of operations of the nation's first educational television, KUHT-TV at the University of Houston, in June 1953, it became possible to examine some of the possibilities inherent



in educational television. Two main problems have been dealt with so far: (a) Effectiveness of television as a medium of formal course instruction. (b) Responses of the Houston-wide television audience to programming on the new educational television station.

**SUBJECTS:** Achievement differences in an elementary psychology course—96 Ss enrolled in traditional campus lecture section; 17 Ss in television lecture only correspondence section; 30Ss in television lecture plus campus discussion section. Elementary biology course—two groups of 78 Ss matched for college class, grades, and sex in both a TV and a non-TV section. Televiewer's reaction study—384 Ss randomly selected from the greater Houston telephone book.

**PROCEDURE:** (a) Final examination grades were compared among the non-TV, TV, and TV-plus-discussion sections in an elementary psychology course. (b) TV and non-TV sections were compared on midsemester examination grades in an elementary biology course. (c) Size of educational TV audience, program preferences, and suggested programs were determined from responses to a standardized questionnaire.

**RESULTS:** 1. Mean final examination scores of 96.11, non-TV, 98.00, TV, and 99.04, TV plus discussion, were obtained in the psychology course. Differences are not statistically significant.

2. Mean midsemester examination scores of 50.17, non-TV, and 45.82, TV, do not yield a statistically significant difference.

3. Fifty-seven per cent of the respondents watched 3 programs or more during a two-week period; of this group, 50% had no favorite program, but 14% favored basketball telecasts, 12% the psychology course, 7% an international discussion forum, while the other offerings were favored by only 5% or fewer of the viewers. Sports, educational films, children's programs, and panel discussions ranked highest, while classical music programs ranked lowest among the suggested programs.

**Fairweather, G. W.** *see* Moran, L. J.

**Falek, Arthur** *see* Kallmann, Franz J.

**Fanshel, David** *see* Kutner, Bernard

**Farber, Maurice L.** (*University of Connecticut*)

#### The anal character and political aggression.

Psychoanalytic theory asserts the existence of an "anal character structure," determined by emotional conflicts early in life and manifested by the traits of orderliness, frugality, and obstinacy. It is further maintained that considerable aggression is generated by this personality constellation. The present study investigates whether individuals exhibiting highly

anal traits manifest high aggression in their political attitudes.

A population of 132 college students was studied. An Analogy Scale was developed for measuring the psychoanalytically postulated traits by embodying them in acceptable sounding statements with which Ss could agree or disagree. An item analysis revealed that the final scale items possess high discriminatory powers and satisfactory intercorrelations.

Political aggression was measured by a group of items in which violent, power-oriented solutions were suggested to various current political problems. These were presented in a Likert-type scale. Here, too, the items retained had high discriminatory power and satisfactory intercorrelations. The two scales were administered to Ss and the relationships noted.

The results reveal a statistically significant relationship between anality and political aggression: of the highly anal, 66% are highly aggressive politically; of the low anal group only 32% are highly aggressive politically. It may be concluded that one determinant of aggressive political attitudes may be traced to depth personality factors directly derived from psychoanalytic theory. Discussion of theoretical implications.

**Farberow, Norman L.** *see* Shneidman, Edwin S.

**Feierabend, Rosalind L., & Janis, Irving L.** (*Yale University*) **An experimental comparison of two ways of organizing positive and negative arguments in persuasive communications.** (Sponsor, Irving L. Janis)

**PROBLEM:** The experiment was designed to test the following "primacy" hypothesis, derived from various theoretical assumptions concerning the resolution of conflicts between the conformity and nonconformity motives that are aroused when a communicator demands acceptance of his recommendations: The introduction of (nonsalient) negative arguments will be less likely to interfere with acceptance of the communicator's position if presented after the major positive arguments have been presented rather than before. This hypothesis is limited to those communication situations where the opposing arguments do not become spontaneously salient; i.e., the audience is either initially unfamiliar with the negative arguments or for any reason fails to recall them.

**SUBJECTS AND PROCEDURES:** 182 high school students were subdivided into three groups. Two of the groups received a pamphlet which urged the students to volunteer for civilian defense activity and which contained both positive and negative arguments. The latter dealt with unpleasant aspects of the volunteer work, presenting information that was not generally known but which presumably would prevent subsequent disappointment. One group received form A,

in which the negative arguments were presented after the positive ones, while a second group received form B in which the order was reversed. The third group (controls) received no relevant communication.

**RESULTS AND CONCLUSIONS:** The relative effectiveness of the two forms of the pamphlet was determined by comparing responses to a postcommunication questionnaire on attitudes toward volunteering for civil defense activity. The form A group (negative arguments last) consistently expressed slightly more favorable attitudes than the form B group. A combined index, based on four key items, indicates that the form A group differs significantly in the expected direction from both the form B group and the control group. The results provide preliminary evidence in support of the "primacy" hypothesis.

This study was conducted as part of the Yale Communication Research Program.

**Feinberg, Leonard D., & Gurvitz, Milton S.** (*Hillside Hospital and Adelphi College*) **The normal adult Rorschach.** (Sponsor, Milton S. Gurvitz)  
**PROBLEM:** Many norms have been proposed for the Rorschach test. However, none has been verified by validation based upon normal populations including the dimensions of age and intelligence.

A number of these hypotheses, *M:FM*, *FC:CF&C*, and manner of approach, will be examined in the light of an adult validating population.

**SUBJECTS:** Three age groups were selected: 20-24, 35-39, 50-54. Within each age range three intellectual levels were defined: superior, average, and inferior.

At each age level 50 cases were tested for the three intellectual levels, so that at each age level 150 cases were collected comprising a total of 450 cases.

All were white, native born individuals.

**PROCEDURE:** Tables were established for three ratios: *M:FM*, *FC:CF&C*, and manner of approach. Tables were established for mean values and for chi-square comparisons.

**RESULTS:** In the superior level at all ages, *M* is greater than *FM*. In the average range, *FM* exceeds *M* at 20-24, *FM* exceeds *M* at 35-39, and at 50-54 *FM* again exceeds *M*. At the inferior level *FM* predominates at all age levels.

At the superior range, *FC* exceeds *CF&C* at all age levels. In the average group at 20-24, *CF&C* exceeds *FC*, and at 35-39 there is a shift to the *FC* side. In the inferior group, *CF&C* is greater at all age ranges.

At the superior level there are no significant changes in the manner of approach. The average intellectual range shows an increase in *D* and a decrease in *d*. The inferior group demonstrates an increase in

*W* and a decrease in *D* and *d* in the 50-54 age group.  
**CONCLUSIONS:** Our results indicate that the norms presently used are based upon individuals of superior intelligence. Proposed norms are presented covering the intellectual range of inferior through superior and the age range of 20 through 54.

No one set of norms is adequate and these values must be related to the age and intellectual level of the subject.

**Feinberg, Leonard D.** *see* Gurvitz, Milton S.

**Feinberg, M. R.** *see* Edgerton, H. A., Zalkind, S. S.

**Feldman, Robert S.** (*University of Massachusetts*)  
**A test of Wolpe's hypothesis concerning the role of learning in abnormal fixations.**

**PROBLEM:** To find out whether abnormal fixations can be explained as an acquired escape response to air blast or shock.

**SUBJECTS:** 185 albino rats.

**PROCEDURES:** Experiment I. Three groups of 37 rats each were trained to respond on a Lashley jumping apparatus and then subjected to an insoluble problem situation for 8, 16, and 24 days, respectively, 10 trials per day. The problem was insoluble in that the windows were interchanged and locked in a random order so that the rats were punished for incorrect responses 50% of the time. The rats were forced to respond by applying an air blast if they did not do so within 30 sec. This procedure eventually led to stereotyped responses to a position (left or right).

Following the no-solution stage, all rats were given a soluble discrimination problem and were forced to jump to the correct window on every other trial. All rats eventually solved the problem within the 200-trial test period.

Experiment II. 74 albino rats were trained and subjected to an insoluble problem as in Exp. I for 16 days. If these rats delayed in making a response they were shocked on the feet. These rats were next given a soluble discrimination problem, but there was no forcing to the correct window. Eleven of the 74 rats solved the problem within the 200-trial test period.

**RESULTS:** Experiment I. The stereotyped responses of the 16- and 24-day groups took significantly more trials to alter than those of the 8-day group. Also, correlations were computed between the number of times air blast was applied and learning scores; and between the number of air blasts and the number of trials it took each rat to alter its stereotyped response. Also, correlations were established between total amount of air blast and learning and alteration scores. Separate correlations were established for each group.

This yielded 12 coefficients none of which showed any relationship between the number or amount of air blast and resistance to response alteration.

Experiment II. A comparison of the mean number of shocks between the rats that solved and those that failed to solve the problem showed that those that failed received significantly fewer shocks. This result is opposite to that predicted by Wolpe.

CONCLUSIONS: The results of both studies failed to support Wolpe's hypothesis that "Each time a jump is forced by the air-blast, it is reinforced by the reduction of the air-blast-induced drive." Maier's proposal that other mechanisms come into play in conflict situations and that abnormal fixations are not conditioned avoidance responses remains as a tenable hypothesis. (Slides)

Feldman, Robert S. *see* Neet, Claude C.

**Felzer, Stanton B.** (*Temple University*) **A statistical study of sex differences on the Rorschach.**

PROBLEM: This statistical analysis included: (1) Analysis of personality differences between college males and college females as revealed by the Rorschach. (2) Analysis of personality differences of subjects separated according to an external masculinity-femininity score—the Guilford-Zimmerman M-F scale. This analysis was made on the following four groups: (a) Masculine males, (b) Nonmasculine males, (c) Feminine females, (d) Nonfeminine females.

SUBJECTS: The population (100 males and 100 females) was restricted to undergraduate students of Temple University, equated with respect to intelligence (ACE Psychological Examination) and chronological age.

PROCEDURE: Rorschach tests were administered and scored by the author in accordance with Klopfer and Kelley, excluding testing of limits. The Guilford-Zimmerman was administered after the Rorschach. Differences between groups (using chi square) were determined for each of the following: (a) location areas (b) determinants (c) summary scores ( $R$ ,  $T$ ,  $T/R$ , sum  $C$ ) (d) ratios ( $M$ : sum  $C$ ,  $M$ :  $FM$ ,  $F\%$ ). RESULTS: (1) Of the 26 Rorschach variables studied, only two showed significant sex differences. (2) Females used significantly more  $FC$  than males. (3) Males took significantly more time per response. (4) Females showed a tendency toward a greater usage of popular responses. (5) Juniors and seniors used significantly more  $FC$  than freshmen. (6) No significant differences between the sexes in the use of the above ratios. (7) In total population there was significantly greater use of  $FM$  over  $M$ . (8) Division

of the total population according to M-F score failed to point out any further differences.

CONCLUSIONS: Rorschach's original postulate of no sex differences was supported in 24 of the 26 variables studied.

**Fenn, Augustus H.** (*Wayne University*) **An experimental investigation of the meanings of understanding in the counseling relationship.**

PROBLEM: This research investigates the relationships between (a) client reactions to a first counseling interview, (b) counselor techniques of demonstrating understanding, and (c) personality structure of clients. Counselor techniques varied on two major dimensions: (a) the focus of understanding on either (i) the client as a person, or (ii) the external situation in which the client is involved; and (b) the type of understanding, as of either (i) an empathic, shared-feeling nature, or (ii) a more cognitive, reasoned knowledge of the client or his problem. Clients varied on the dimension of centrality-peripherality; that is, the relative accessibility of the more inward and intimate aspects of the client's personality.

SUBJECTS: 80 student teachers, ten for each experimental condition.

PROCEDURE: Both the focus and type of understanding were varied through the use of role-playing techniques in which student teachers, identifying with the client in his role, observed professional actors in standardized counseling situations. Four such situations demonstrated (a) understanding of the person through empathy, (b) understanding of the person through knowledge, (c) understanding of the situation through empathy, and (d) understanding of the situation through knowledge. Instruments were developed for measuring centrality-peripherality of personality structure. Comparison of the eight experimental conditions was made by obtaining scores on 16 indices which referred to relevant experiences which clients had previously been shown to have in the initial phases of counseling. Data were treated by analysis of variance and covariance in  $2 \times 2 \times 2$  factorial design.

RESULTS: Significant differences were obtained based upon foci, types, personality structures, and the interactions of these factors. Subjects who received empathic understanding scored higher on most indices. The differences obtained between foci and between personality structures varied differentially according to the type of understanding and the particular index involved.

CONCLUSIONS: Definite measurable and consistent differences are obtained in the reactions of clients to different techniques used by counselors in demonstrating their "understanding."



**Fiedler, Fred E. (University of Illinois) Interpersonal perception and sociometric structure in prediction of small team effectiveness.**

**PURPOSE:** Two studies investigated the relation of the leader's interpersonal perception to the effectiveness of small military units.

Two previously reported studies of high school basketball and surveying teams yielded significant relations between interpersonal perception and group effectiveness. The present studies extend the hypotheses from informal to formally organized teams.

**EXPLORATORY STUDY**

**Sample.** 53 B-29 bomber crews. The aircraft commander is formal leader of the crew.

**Procedure.** Interpersonal perception is measured by Assumed Similarity scores (ASo) obtained when we compare predictions that *S* makes (a) for his most and (b) for his least preferred co-workers on the sample personality test items. Sociometric ratings of crew members were obtained.

**Criterion.** Radar Bomb scores, indicating the average theoretical error of bomb drops on assigned targets, served as criteria.

**Results.** Significant relations obtained between aircraft commander's ASo and Radar Bomb scores only in crews having certain sociometric structure, e.g., where AC and keymen mutually chose each other. ( $- .48, N = 22$ )

**VALIDATION STUDY**

**Sample.** 25 Army Tank Crews participated in a large Army weapons analysis experiment. Each 5-man crew was systematically rotated over 5 tanks. The tank commander is formal crew leader.

**Procedure.** ASo scores and sociometric ratings were obtained as in the exploratory study.

**Results.** The tank study unequivocally supported the findings of the first study; e.g., where commander and keymen mutually chose each other, the commander's ASo correlated significantly with objective criteria as in the bomber crews. ( $- .61$  and  $.72, N = 9$ )

Discussion will deal with practical implications to team assembly and with theoretical implications which lead to a revised conception of sociometric structure in prediction of small team effectiveness.

**Fiedler, G. O. see Colmen, Joseph G.**

**Findlay, Donald C., Matyas, Seymour M., & Rogge, Hermann. (Human Research Unit No. 1, OCAFF, Fort Knox, Kentucky) The effect of ability grouping on the proficiency of low-aptitude men in Army Combat Basic Training.**

**PROBLEM:** To ascertain whether the achievement of low-aptitude (low "intelligence") men in Combat Basic Training could be increased by (a) placing

them in squads with an unusually large proportion of high-aptitude men, and (b) providing incentive for high-aptitude men to help low-aptitude men in their squads.

**SUBJECTS:** 400 trainees from two Combat Basic Training companies. One-half of the 200 men in each company had scores of 90 and below ("low aptitude") on the Area I scale of the Army Classification Battery. One-fourth of the men in each company had Area I scores of 91 to 110 ("medium aptitude"), and one-fourth had scores of 111 and higher ("high aptitude").

**PROCEDURE:** In each company, three types of squads were formed: (a) squads made up of one-half high-aptitude men and one-half low-aptitude men; (b) squads made up of one-fourth low-aptitude men, one-half medium-aptitude men, and one-fourth high-aptitude; and (c) squads made up of low-aptitude men only. Each platoon contained four squads of the same type of aptitude composition.

To provide incentive for high-aptitude men to assist low-aptitude men, the squads in each platoon were competed against one another for seven weeks in weekly proficiency tests. The assumption was made that high-aptitude men in a squad would assist low-aptitude men prepare for the weekly testing since the awarding of passes and mess-hall privileges was based upon the performance of the entire squad.

**RESULTS:** The achievement of low-aptitude trainees was not significantly facilitated by association with higher aptitude trainees, in spite of the fact that significant and practical differences were found between the achievement of low-, medium-, and high-aptitude men. (Slides)

**Findley, Warren G. (Educational Testing Service) A rationale for evaluation of item discrimination statistics.**

Several simplified methods of item analysis depend on comparing the number in an upper fraction (quarter, third, 27%) of the total sample who get an item right with the number in the corresponding lower fraction of the sample who get it right. Usually the difference between these figures is offered as the measure of effective discrimination achieved by the item. Use of such simplified indexes of discrimination is generally justified in terms of ease of calculation or comprehensibility by the statistically unsophisticated.

In this paper it will be demonstrated that the simple differences described above, or their relation to the maximum possible values of such differences, are directly proportional to the net proportion of correct discriminations achieved by the item. For example, if the number right in the top 100 is compared with

the number right in the bottom 100, a maximum of  $(100 \times 100)$  or 10,000 correct discriminations will be achieved if all the top 100 get the item right and all the bottom 100 get the item wrong. If 90 of the top 100 and 40 of the bottom 100 get an item right, it may be argued that  $(90 \times 60)$  or 5,400 correct discriminations are achieved between those in the top group who get the item right and those in the bottom group who get it wrong. On the other hand,  $(10 \times 40)$  or 400 discriminations in the wrong sense are achieved between those in the top group who get the item wrong and those in the bottom group who get it right. The difference,  $5,400 - 400$ , bears the same ratio to the maximum 10,000, that the simple difference  $90 - 40$  bears to 100. This is completely general.

Other properties of these simple difference statistics and the relation of these statistics to measures of item-test correlation will be pointed out.

**Fink, Howard H.** (*Ingham County Rehabilitation Center, Okemos, Michigan*) **The relationship of time perspective to age, institutionalization, and activity.**

**PROBLEM:** To investigate the time perspectives of aged males and the relationships of these time perspectives to institutionalization, to age, and to activity as measured by the amount of time per week devoted to work, hobbies, and organizational activity.

**SUBJECTS:** A group of 30 men in a county home for the aged and a group of 30 noninstitutionalized men matched to the first group on the basis of age, education, and occupational strata. Each group was divided into two age subgroups of 15 members.

**PROCEDURE:** Two instruments were used to assess Ss' time perspectives: a time perspective scale and five TAT cards. The time perspective scale was an interview method in which Ss were asked to list the thoughts or conversations they had had during the two weeks preceding the interview and to name the division of time—past, present, or future—with which the thought or conversation was concerned.

The usual directions for TAT administration were not given. Instead each S was asked to "tell a story about this picture." The responses were examined to determine their temporal content.

A personal data questionnaire was also administered.

**RESULTS:** (a) The institutionalized group was more concerned with the past and less concerned with the future than was the noninstitutionalized group. (b) The older members of each group were more interested in the past and less interested in the future than were the younger members of each group. (c) Activities such as work and hobbies were related to future-oriented time perspectives.

**CONCLUSIONS:** In general the effects of institutionalization and increasing age bring about an increased concern with the past. Of the two factors, institutionalization seems to exert a greater influence upon the time perspectives of aged men.

**Fink, John B.** (*University of Louisville*) **Acquisition, extinction, and counterconditioning effects of sequential learning as a function of number of available choice-point responses.**

**PROBLEM:** Sequential learning may be viewed as a series of conditioned response specifications at successive choice points. It was hypothesized that number of trials to criterion would be a positive function of the number of responses made available by the choice-point situations, since the initial probability of any particular response is inversely related to the total number of available responses. With respect to extinction and counterconditioning, it was hypothesized that there would be no significantly incremental or decremental function relating sequential task response decrements to number of available choice-point responses inasmuch as an increment in the probability of any response other than the previously conditioned response would result in a decrement in the latter.

**SUBJECTS:** 60 students.

**PROCEDURE:** A "verbal maze" situation was used, each "choice point" consisting of a simultaneous presentation of a specified number of nonsense syllables. Eight choice points constituted a sequence or trial. The Ss were divided into three groups which, respectively, had 2, 3, and 5 available choice-point responses. The learning session consisted of alternate presentations of training and test trials to a criterion of two perfect test trials. A correct response was reinforced by E's saying "correct." Subsequent to the learning session, each group was broken down into two subgroups: (a) extinction and (b) counterconditioning. The extinction subgroup received no reinforcement. The counterconditioning subgroup was reinforced for all choice-point responses that did not belong to the previously defined class of "correct" responses.

**RESULTS:** Analysis of variance confirmed the experimental hypotheses at the .05 level. The function relating trials-to-criterion to number of available choice-point responses is incremental and positively accelerated.

**CONCLUSIONS:** Learning rate for a sequential task is negatively related to number of available choice-point responses. Extinction and counterconditioning decremental rates are not so related. (Slides)

**Fink, Max** see Bender, Morris B.

**Finn, Michael H. P.** (*Springfield State Hospital, Sykesville, Maryland*) **An investigation of apperceptive distortion in the obsessive-compulsive character structure by three methods: with special reference to a defense mechanism, reaction formation.**

**PROBLEM:** To study apperceptive distortion and its relation to reaction formation in obsessive-compulsive character structures by three methods of human expression.

**SUBJECTS:** The sample consisted of ten obsessive-compulsive characters and ten control non-obsessive-compulsive characters, all college students equated as to age, intelligence, and character structure.

**PROCEDURE:** Methods of expression were: (a) verbal; (b) graphic reproduction of ambiguous pictures of affect situations; and (c) graphic reproductions of four distorted Bender-Gestalts. Each picture was exposed .5 sec. and Ss recorded what they saw. On repeat exposure Ss drew what they saw. The distorted Bender-Gestalts were then exposed 5 sec. per card and Ss drew what they saw. The results were rated as to whether the subjects changed the material in a loving or aggressive direction. The obsessive-compulsives and the non-obsessive-compulsives were then compared as to differences in apperceptive distortion. **RESULTS:** Statistically significant differences (.01) were found between the groups, the obsessive-compulsives apperceptively distorting more positively (loving) than the non-obsessive-compulsives. In the obsessive-compulsives, the most positive distortions occurred in the reproductions of the Bender-Gestalts, then verbal description, and finally in the graphic reproduction of the four pictures.

**CONCLUSIONS:** Obsessive-compulsive characters minimize aggression to the greatest degree on a "geometric" motor level, next, a verbal level, and finally, in graphically reproducing visually perceived emotional situations. The tendency of the obsessive-compulsive to change aggression into love can only be attributed to repression rather than reaction formation owing to the definition of reaction formation. The results suggest that previous studies with defenses, e.g., repression, do not measure what they purport to measure due to the misinterpretation of the definitions of defense mechanisms and the occurrence of defenses in clusters rather than singly.

**Finocchio, Dom V.** (*Department of Clinical Science, School of Medicine and Department of Psychology, University of Pittsburgh*) **Sensory preconditioning in the monkey.**

**PROBLEM:** The sensory preconditioning experiment has become a controversial point between the rein-

forcement and the non-reinforcement theorists. The present investigation was conducted (a) to determine if the preconditioning effect could be produced with any certainty, and (b) to determine the effect of preconditioning training on the acquisition of an avoidance conditioned response.

**SUBJECTS:** 11 naive, preadolescent rhesus monkeys.

**PROCEDURE:** The apparatus utilized was a modified type of Skinner box adapted to the monkey.

1. Preconditioning trials. Subsequent to a period of adaptation, the experimental animals received 210 trials of tone and red light at 15 trials each day. One group of control animals received an equivalent number of trials of tone only. The second control group was given continued adaptation trials throughout this period.

2. Avoidance conditioning. An avoidance response to red light was established in all animals during this phase. The conditioning procedure was as follows: The red light was presented for 2 sec. prior to the onset of the shock through the grid floor of the chamber. The paired presentations continued until the animal made the appropriate bar-pressing response which terminated both the light and shock. Conditioning continued at 15 trials per day until the criterion of 90% avoidance responses on two successive days was reached.

3. Critical test. The day after the conditioning criterion was achieved the tone stimulus was presented alone with the same adaptation period and intertrial intervals that prevailed during conditioning. These trials continued until the avoidance bar-pressing response had been extinguished to the 10% level on two successive days.

**RESULTS:** The *H*-test variance analysis applied to the conditioning data indicated that none of the measures—trials to condition, CR's to criterion, or spontaneous responses during conditioning—differed significantly between the experimental and combined control groups. In the critical test the experimental group made significantly more responses to the tone stimulus and also required a significantly greater number of trials to reach the extinction criterion than did the control groups.

**CONCLUSIONS:** (a) Sensory preconditioning has been reliably demonstrated in another organism—the monkey. (b) The improved control group technique rules out the influence on generalization of unfamiliarity with the test stimulus. (c) The rate of acquisition of the conditioned bar-pressing response was not affected by the preconditioning training. (Slides)

**Finocchio, Dom V.** see Miller, R. E.



**Fisher, Jerome, & Gonda, Thomas A.** (*VA Hospital, San Francisco*) Critique of a criterion: the diagnostic sensitivity of neurologic techniques vs. Rorschach findings in brain pathology.

This investigation compares the validities of standard neurologic techniques with a Rorschach "sign" method in extreme and borderline cases of brain disease. It differs from previous research on brain pathology by (a) obtaining a more representative sample through studying patients admitted to a veterans hospital neurology ward with varied complaints and symptoms referable to the nervous system, and (b) delineating between brain pathology and control groups on the basis of intensive neurologic work-up rather than of psychiatric diagnoses.

On the basis of combined, reliable ( $r = .93$ ) judgments of two attending neurologists who studied the completed hospital charts, 118 patients were divided into those having pathology above the *foramen magnum* (84 cases) and those presumably having no such pathology (34 cases); both groups were comparable in age, intelligence, education, and socioeconomic status.

Both groups received thorough, equivalent initial neurologic work-up (including electroencephalograms, skull X rays, and lumbar punctures). Additional procedures, such as pneumoencephalograms, were performed as indicated.

In an earlier cross-validation study of four Rorschach "organic" systems applied to the same sample, the Piotrowski method was found to be the most accurate and hence was used in the present investigation.

The validity coefficients ( $\phi$ ) reveal that the Rorschach and the electroencephalogram discriminate between the groups at a very high level of significance; the neurologic examination and lumbar puncture are still significant but at a lower level. The skull X rays and pneumoencephalograms fail to reach statistical significance.

Because the criterion was based in part on the neurologic findings, the validity obtained for the neurologic techniques is probably inflated. Since the Rorschach did not enter into establishment of the criterion, the findings show that as an isolated procedure it is superior to the best of the individual neurologic techniques in diagnosing brain disease. Further theoretical, applied, and research implications are discussed. (Slides)

**Fisher, Jerome** see Harris, Robert E.

**Fisher, Rhoda** see Fisher, Seymour

**Fisher, Seymour, & Fisher, Rhoda.** (*VA Hospital, Houston, Texas*) A study of the relationship between personal insecurity and one's theoretical orientation toward psychological methodology.

**PROBLEM:** To test the hypothesis that the degree of insecurity of an individual ego involved in psychological work bears a significant relationship to the degree to which he favors an objective vs. intuitive methodology in psychology.

To demonstrate further that such a relationship does not exist in persons who are not ego involved in psychological work.

**SUBJECTS:** 51 graduate students, PhD candidates in psychology; 51 undergraduates in a general psychology course.

**PROCEDURE:** An attitude scale was used to determine the degree to which each *S* favored intuitive methods in psychology as contrasted to objective methods. The scale required *Ss* to agree or disagree with statements advocating different approaches to problems in psychology.

Level of personal insecurity was measured by means of a series of vague pictures. At one extreme, the pictures could potentially be perceived as involving threat and danger. At another extreme, they could be perceived as involving safe, stable situations. Subjects indicated their interpretations of the pictures by selecting from listed multiple-choice alternatives. The insecurity score was based on the number of insecurity alternatives selected.

**RESULTS AND CONCLUSIONS:** The mean insecurity score of the psychology graduate students in that half of the group most objectively oriented toward psychological methodology was significantly lower (close to 1% level) than the mean insecurity score of those in the more intuitively oriented half of the group. Among the undergraduate students, the difference in mean insecurity between the two attitude groups was not significant. These results suggest that the personal problems of those who are ego involved in a science may significantly influence their attitudes toward the methodology of that science.

**Fisher, Seymour** see Cleveland, Sidney E.

**Fishman, Joshua A., & Lorge, Irving.** (*Jewish Education Committee of New York and Teachers College, Columbia University*) The role of the culture-group affiliation of the "judge" in Thurstone attitude-scale construction.

**PROBLEM:** What is the relationship, if any, between the culture-group affiliations of the "judges" and their item rankings for the purposes of Thurstone scale construction.

**SUBJECTS:** 27 "judges," all in their late 20's or early 30's, three each affiliated with one of the following nine culture groups: Egyptian, Japanese, Filipino, White Protestant American, Jewish-Orthodox American, Jewish-Conservative American, Jewish-Reformed American, and Jewish-Secularist American.

**PROCEDURE:** 117 statements of human faults were ranked by Ss along a continuum, from least damaging (or "neutral") through most damaging (most severely negative).

**RESULTS:** (a) With the exception of the item rankings of the Jewish-Orthodox American "judges," the average within-culture-group rank-order correlations were greater than the average across-culture-group rank-order correlations. (b) When the average within-culture-group rankings were converted to scale values on a linear scale, the item scale values derived from the rankings of the judges from any one culture group were found to differ substantially from the item scale values derived from the rankings of the judges from all other culture groups.

**CONCLUSIONS:** These data support the generalization that the culture-group affiliation of judges substantially influences item rankings and, thereby, the resultant Thurstone scale values. Many methodological problems concerning the proper selection of Ss both for Thurstone scale construction, as well as for Thurstone scale administration, must be examined in the light of this evidence.

**Fitts, Paul M.** *see* Weinstein, Meyer

**Fitzwater, Mylen E.** *see* Schwerin, Erna

**Fleishman, Edwin A.** (*AF Personnel and Training Research Center*) **Factor pattern as a function of different levels of proficiency on a complex psychomotor task.**

**PROBLEM:** A previous study has indicated that considerable changes in the factor structure of a psychomotor test may occur as practice on the task continues. The present study is a further investigation of this problem with a different psychomotor task and is aimed at testing the generality of certain of the previous findings. The issues involved in these studies bear on problems of predicting more advanced levels of proficiency in psychomotor skills as well as on problems of test development in this aptitude area.

**SUBJECTS:** 264 basic airmen.

**PROCEDURE:** Ss received extended practice on the Discrimination Reaction Time apparatus (16 20-setting trials), and in addition received a carefully selected battery of printed and apparatus reference tests. The correlations among scores at eight stages of practice on the Discrimination Reaction Time together with scores on 19 of the reference tests were obtained and

subjected to a Thurstone Centroid Factor Analysis.

**RESULTS:** The orthogonal solution of rotated factors revealed nine meaningful factors: Spatial Relations, Rate of Arm Movement, Psychomotor Coordination, Verbal Comprehension, Perceptual Speed, Mechanical Experience, Dexterity, Reaction Time, and a factor specific to the stages of practice on the Discrimination Reaction Time task.

**CONCLUSIONS:** The results confirm earlier findings that systematic changes occur in the factors contributing to performance on such tasks as practice is continued. The abilities contributing most of the variance later in training were not necessarily the same as those contributing at early stages of proficiency on the task. For example, the Spatial Relations factor was the main factor early in practice with some involvement of Verbal Comprehension. Later in practice the factors of Reaction Time and Rate of Arm Movement predominated.

Implications for predicting advanced levels of proficiency in such skills are discussed.

**Fogel, J.** *see* Corrie, C. C.

**Ford, Adelbert.** (*Lehigh University*) **Localization of muscle tone during severe mental effort.**

The problems here considered are: (a) do the tensions during mental stress rise and fall simultaneously in all of the muscles, and (b) do some muscles have a higher predisposition than others for exhibiting this tension?

Twenty-seven male college students were used as Ss; the tension potentials of eight muscles were electronically integrated, four at a time in latin-square order, for the following locations: masseter, sternocleidomastoid, palmaris longus dominant, palmaris longus nondominant, sublimis dominant, sublimis nondominant, gastrocnemius, and digitorum. (Dominant refers to the hand customarily used, i.e., right for a right-handed person.) Thus the head, the arms in extensor and flexor functions on both sides, and the legs were measured for potentials during mental stress periods compared with equivalent mental relaxation periods. The mental work was arithmetical calculation.

There were high tension correlations between the muscles of opposed pairs, but such correlations have a possibility of inflation from cross-electrode leakage, impossible to avoid with surface fixation. For other muscles there was only slight correlation, and it appears that tensions seem to flow over the muscular system like the waves of the sea, with one muscle in a state of rise while another is subsiding, at a very slow rate.

Every one of the eight muscles dominated the ten-

sion output at some time or other during fairly long and consistent intervals, but for the majority of Ss there was a slight tendency for the arm muscles to predominate. (Slides)

Fordyce, William *see* Ax, Albert F.

Forer, Lucille K. (*University of Southern California*) **Prediction of assaultiveness in schizophrenic patients.**

**PROBLEM:** To test current clinical theories regarding prediction of assaultiveness of hospitalized schizophrenic patients from their drawings of human figures.

**SUBJECTS:** 134 male patients chosen on the basis of presence or absence in their behavior of overt assaultiveness.

**PROCEDURE:** Drawings were evaluated by means of check lists incorporating items that referred to drawing technique and treatment of anatomical parts. Preliminary selection among items associated in the literature with assaultiveness or related behavior was made by means of a pilot study. Differentiating items were used to evaluate the drawings of 50 Ss. Items differentiating beyond the 10 per cent level were incorporated into a new check list to evaluate drawings of the remaining Ss. Items found to be beyond the probability level of 10 per cent in both studies were used as a scale of assaultiveness upon which to score drawings used in both studies.

**RESULTS:** (a) The number of significant items in the final validation exceeded chance expectation. (b) Assaultive patients manifested more primitive treatment of the female figures than of the male figures drawn. (c) An assaultive scale incorporating significant items differentiated between cases and controls in all groups. (d) A cut-off score of five signs predicted over half of the assaultive patients and over four-fifths of the nonassaultive patients.

**CONCLUSIONS:** (a) The assaultive scale must be interpreted only as indicating a trend in the direction of aggression by the patients to whose drawings it is applied. (b) Differential treatment of male and female figures appears to reflect important attitudes toward the self and others. (c) In graphic portrayal of the human figure, assaultiveness is associated with a primitive conception of the nature of human beings and of the interrelationships among persons. (d) Need was revealed for examination of current analogical interpretations of drawings and for theoretical thinking regarding what the drawing represents to the person who draws it.

This paper is an abstract of a dissertation presented in partial fulfillment of the requirements for the PhD degree at the University of Southern California, June 1953.

Forgays, Donald G. (*AF Personnel and Training Research Center, Randolph Field*) **Group intactness and the prediction of combat performance of bomber crews from training measures.**

**PROBLEM:** Researchers concerned with the prediction of the future performance of groups from measures obtained earlier in the history of the group face the problem of just how many changes in group membership during the time interval can be tolerated without sacrificing prediction relationships. Typically a fairly rigid definition of intactness is employed without any demonstration that it is necessary or even desirable. This study attempts to assess the differential prediction of combat performance from training measures of bomber crews representing two levels of intactness during the intervening period.

**SUBJECTS:** Approximately 100 Air Force medium bomber crews flying combat missions with the Far Eastern Air Forces in the Korean conflict.

**PROCEDURE:** The two levels of intactness employed were as follows: (a) a crew is eliminated if it has had an aircraft commander change, more than two other officer changes, or more than three changes of any sort; and (b) a crew is eliminated if more than 50% of its original members have been changed. Predicting variables included performance ratings given the crew during training, bombing and navigational accuracy scores achieved during training, and sociometric ratings obtained during training. Criterion variables included combat performance ratings given the crew, combat bombing and navigational accuracy scores, and peer ratings obtained in the combat situation.

**RESULTS:** In general, relationships between performance ratings, objective performance scores, and the like, obtained during training and the combat performance criteria were about the same for both the intact and the identifiable samples. However, since the less intact sample was considerably larger, as might be expected, more of these relationships were statistically significant. Prediction relationships between sociometric measures obtained in training and the combat criteria were significant only for the more intact sample in spite of the difference in sample size.

**CONCLUSIONS:** The obtained results indicate that the importance of integrity of group membership for future prediction of group performance from earlier performance is specific to the nature of the predicting variables. (Slides)

Frank, G. H. *see* Corrie, C. C.

Franklin, Joseph C. *see* Brožek, Josef



**Frederiksen, Norman, & Saunders, D. R.** (*Educational Testing Service*) **Development of a work-sample measure of administrative proficiency.**

**PROBLEM:** To develop measures of the effectiveness of instruction in various aspects of the Field Officer Course, Air University.

**SUBJECTS:** 489 students in the course.

**PROCEDURE:** As a test situation, an imaginary Air Force wing was created, in which students could be asked to play the role of a wing commander, or director of personnel, materiel, or operations. In each of these roles the examinee was provided with an "in-basket" containing letters, memoranda, etc. calling for action. About ten problems were included in each "in-basket," but the problems were not always identified as such, and were sometimes merely implicit in the combination of several separated papers.

The examinees were given instructions designed to encourage their taking definite action on each problem within the two hours allowed, even though they did not have extensive "experience" in the imaginary situation, and could not get more information or exchange ideas orally as in a real situation.

In constructing the in-basket materials the major problem was to structure them to reduce the variety of actions taken by different Ss, while keeping them brief, realistic, and directed toward some instructional aspect of the Field Officer Course.

A scoring plan was obtained through content analysis of the actual responses of a group of Ss. The value of these responses was determined by experienced AF officers as judges.

The scoring reliability, test reliability, and test validity in terms of how scores vary with type of experience for groups of officers have been investigated and will be discussed.

**CONCLUSION:** It is possible to construct a work-sample measure of administrative proficiency that is group-administerable and feasible to score semiobjectively. Higher validities may need to be attained before the measure is suitable for individual assessment.

This work was supported by the Air Force under Contract AF 33(600)5833.

**French, Elizabeth G.** (*AF Personnel and Training Research Center*) **Experimental investigation of a method of measuring achievement motivation.**

This study is part of a larger one concerned with the role of complex motivations, or acquired drives, in various Air Force situations. The specific aim of the present study was to determine experimentally the relation between scores on a measure of achievement motivation and changes in motivation level, on the

one hand, and performance, on the other. The measuring device consists of brief verbal descriptions of behavior which S is required to "explain." The score is the number of achievement references appearing in the "explanations."

**PROCEDURE:** The achievement motivation test was administered to 110 young male members of an officer candidate program. The Ss were then divided into high- and low-motivation groups on the basis of the test scores and retested under one of three experimentally created motivational conditions: relaxed, task motivated, and extrinsically motivated. The retest procedure included administration of a code test, the creation of the various motivational levels by verbal instruction, and the administration of a second form of the achievement motivation test and a second form of the code test.

**RESULTS:** (a) Scores on the second form of the achievement motivation test were significantly related to initial scores on the test and to the experimental conditions. (b) The achievement motivation scores were significantly related to performance improvement on the code test. (c) The variability in code improvement scores associated with motivation test scores was greater than that associated with the experimental conditions.

**CONCLUSIONS:** The results indicate that the test is sensitive to changing conditions of motivation and is related to performance that is dependent, in part, on that motivation. It promises to be a useful tool in testing hypotheses involving achievement motivation.

**Fruchter, Benjamin, Blake, Robert R., & Mouton, Jane S.** (*University of Texas*) **The reliability of interpersonal judgments in three-man groups.**

**PROBLEM:** The purpose of this investigation was to determine the consistency of judgments of interpersonal relations made on the basis of two independent, 15-min. periods of interaction in three-man groups.

**SUBJECTS:** 33 unacquainted undergraduate college students.

**PROCEDURE:** Ss were divided into 11 three-man groups and given the task of discussing the question "Should college grades be abolished?" and of coming to a solution and writing a brief report. On completing the task Ss ranked members of their groups, including themselves, on 12 interpersonal behavior items. Trained Os also ranked group members on the same items.

After the first administration the entire procedure was repeated with each S being assigned to a group composed of two others with whom he was unacquainted, a different but similar task, and a different O.

**RESULTS:** Consistency between sessions was determined for self-self, other-other, observer-observer, and group-group comparisons. Rankings on items such as leadership behavior, interest shown, and dominance were significantly related in most of the inter-session comparisons. Items like desired to do a good job, yielded to others, and satisfaction with group decision were not judged consistently.

The consistency of within-session judgments was determined for observer-self, observer-other, self-other, and observer-group comparisons.

**CONCLUSIONS:** Judgments of some aspects of interpersonal relations observed in two independent short-term interaction sessions were significantly related. Likewise judgments made within a session by observers, by self, and by members of the groups were significantly related to one another for some of the items. The use of such judgments as one basis for crew assembly seems to represent a sound direction for development.

This research was performed under Contract AF 18(600)-602 with the Combat Crew Research Laboratory, HRRC, Randolph AFB. (Slides)

Gadel, Marguerite S. *see* Kriedt, Philip H.

Gaier, Eugene L., & Wrigley, Charles. (*University of Illinois*) **An investigation of problem-solving techniques.**

**PROBLEM:** The Balance Problems Test (BPT) was designed to measure the extent to which individuals select and make effective use of principles as opposed to factual information in problem solving. Earlier results indicated that inclusion of the BPT in a battery for prediction of high school achievement led to a significant improvement in prediction. This paper considers how far the BPT measures abilities already represented in the Airman Classification Battery (ACB), and how far it adds a distinctive contribution of its own.

**PROCEDURE:** 758 airmen, for whom ACB and two mechanical job-knowledge test scores were obtainable, served as Ss. A principal-axes factor analysis was calculated for the resulting 28-variable matrix, and the eight largest factors were retained for rotation of axes by the quadrimax method. This maximizes the sum of the fourth powers of the elements of the factor loading matrix.

**RESULTS:** BPT scores for use of facts and use of principles appear in a factor of their own, with the subject who makes use of principles referring less to facts. Those with more education, greater educational achievement, and greater ability (as measured by the ACB) make slightly greater use of principles, but the tendency is not marked. The use of principles is only slightly more effective than the use of facts

in respect to solving the problems. The third score, the number of items correctly answered, appears to offer little not already in the ACB.

The job-knowledge tests similarly have low loadings in the conventional factors of the ACB, but appear with high loadings in a separate factor. The BPT and job-knowledge tests appear to be sufficiently independent of the existent battery to warrant further study of their predictive value.

Garman, Glen D. (*Fort Douglas VA Hospital, Salt Lake City*) **The Strong Vocational Interest Inventory as a measure of manifest anxiety.**

The belief that information pertaining to adjustment is of value in vocational counseling and employee selection situations and that responses to the Strong Vocational Interest Inventory contain such information led to the investigation of the Strong for possible indices of anxiety. Theoretical considerations and experimental findings suggest a close relationship between tested or rated anxiety and neuroticism (adjustment).

**SUBJECTS:** (a) 403 male graduate students in psychology, and (b) 200 male college freshmen. A random half of the graduate group was used for item analysis and derivation of scoring weights; the rest of the Ss were used for cross validation.

**PROCEDURE:** Item analysis and pattern analysis were both applied to the Strong items because of recent arguments that the latter utilizes more of the information contained in psychological data. Two promising MMPI scales, the Taylor Manifest Anxiety Scale, and the Winne Scale of Neuroticism were used as criteria.

**RESULTS:** Item analysis yielded the most promising anxiety measure for the Strong, with validity coefficients of .36 and .42 for two cross-validation samples. There was a slight but significant relationship between anxiety, as measured by this scale, and "feminine" interests for men. "Atypicality" of response to Strong items was also significantly related to criterion scores. McQuitty's "integration" measure for patterns of response to Strong items, and patterns of scores on the Strong occupational scales failed to predict criterion scores, as also did response category "preferences."

**CONCLUSIONS:** The anxiety scale developed does not possess sufficient validity for differentiation of individuals in the middle score range, but appears useful for (a) screening extreme cases, (b) differentiating groups, and (c) research on relationships between anxiety and vocational interests.

Although not critical, the comparison of item analysis and pattern analysis throws some doubt upon the practical value of present laborious pattern-analy-

sis methods for the kind of task undertaken in this study.

Garnezy, N. *see* Kalish, H. I.

Garvey, W. D., & Henson, Jean B. (*Naval Research Laboratory, Washington, D. C.*) **Statistical encoding of the stimulus input to the human operator.** (Sponsor, W. D. Garvey)

**PROBLEM:** Given a specific number of events which an operator must handle to accomplish the operational task of a display-control system, how should these events be assigned to the available stimulus-response possibilities to provide for the most efficient operator performance?

**SUBJECTS:** Nine Naval enlisted men.

**PROCEDURE:** With a display-control system that provided 100 possible stimulus-response alternatives a preliminary investigation was made to obtain a measure of the operator's differential ability to execute the stimulus-response alternatives. A population of 760 events was distributed among the 100 alternatives with the following characteristics: Each of 36 alternatives had a 0.0221 probability of occurring; each of 28 alternatives had a probability of 0.0053; and each of the remaining 36 alternatives had a probability of 0.0026. This population of events was matched with the operator's ability to perform in three ways:

Code A—Events having the highest probability were assigned to stimulus-response elements which the operator could execute with the least difficulty; those having the lowest probability were assigned to the most difficult stimulus-response elements.

Code B—A random relationship was established between probability of event and operator's ability to respond.

Code C—The assignment of events was the reverse of that made for Code A.

Three groups of matched Ss were assigned to each of the three code groups. Each S was presented 760 stimuli per day for 23 days. Rate of responding was used as the measure of performance.

**RESULTS:** Statistical analyses showed that throughout the first 18 days performance was most efficient with Code A, next most with Code B, and least with Code C. During the last four days, performance continued to be best with Code A; however, performance with Codes B and C was equivalent.

A discussion of these results relative to information theory will be made. (Slides)

Gaydos, Henry F. (*Headquarters Quartermaster Research and Development Command, Natick, Massachusetts*) **Intersensory transfer in form recognition.**

**PROBLEM:** Although transfer of learning across sensory modalities is known to occur, little quantitative

information is available as to the extent to which such transfer may occur. The present study deals specifically with the transfer of form recognition between the visual and the tactual-kinesthetic modalities, and purports to answer the following: (a) Can shapes learned through one modality be recognized through the other without appreciable relearning? (b) Are vision and touch equally efficient media for learning to differentiate and recognize the given stimulus shapes? (c) Is transfer from touch to vision any more efficient than from vision to touch? (d) Is there any correlation between degree of transfer and rate of initial learning?

**SUBJECTS:** 86 college students divided into two groups of 43 each.

**PROCEDURE:** Ss of Group I learned to differentiate and recognize, by touch alone, each one of a set of 12 bi-dimensional stimulus shapes, and they were then tested for transfer to recognition by sight. The Ss of Group II learned the task by sight alone, and were tested for transfer to touch. Trials and errors in reaching criterion were recorded.

**RESULTS AND CONCLUSIONS:** Statistical analysis of the data led to the following interpretations:

1. Transfer of recognition occurred both from sight to touch and from touch to sight. The degree of transfer was very great in both instances.

2. Under the conditions of the experiment, touch and vision appeared equally efficient in learning to differentiate and recognize the stimulus shapes.

3. Transfer appeared significantly greater in going from touch to vision than in going from vision to touch.

4. The rate of initial learning had no significant correlation with the degree of transfer which took place. That is, slow learners transferred just as well as fast learners. (Slides)

Gebhard, J. W. *see* Mowbray G. H.

Geist, Harold. (*Solano County School System, California*) **Testing patterns in epilepsy.**

**PROBLEM:** To discover whether there are differences in the testing patterns of idiopathic and organic epileptics with the aim of discovering the etiology of the idiopathic group.

**SUBJECTS:** 30 epileptics, 15 organic and 15 idiopathic.

**PROCEDURE:** 30 epileptics were classified according to the conventional division of idiopathic and organic (essential and genuine). They were redivided into known, probable, and unknown etiology. The criteria used for classification were history of trauma, X rays, and electroencephalogram reports. Each patient was administered the MMPI, Wechsler-Bellevue (including calculation of scatter analysis and deterioration index), the Rorschach, Thematic Apperception Test,



Blacky Picture test, Bender-Gestalt, and Draw-A-Person Test. Results on all examinations were calculated qualitatively and quantitatively, and results compared within and between each of the groups of epileptics.

**RESULTS:** The known group differed significantly from the probables and unknowns in all tests except the Wechsler-Bellevue. A regressive pattern was found in the unknown group, which would suggest either a fixation at or regression to an earlier mode of psychosexual functioning.

**CONCLUSIONS:** The results of the examinations show that, although there are no particular personality patterns in the epileptics of this group, those of no demonstrable organic etiology show a regressive psychodynamic pattern. This has wide implications in the treatment of idiopathic epileptics by dynamic therapy.

**Gelber, Beatrice.** (*University of Chicago*) *Investigations of the behavior of *Paramecium aurelia*: IV. The effect of different training schedules on both young and aging cultures.*

In all experiments of this series, "hungry" cultures of paramecia were tested for approach to a clean, sterile platinum wire, then given training with the same wire baited with bacterial food. Approach to the sterile wire after training constituted the data.

Previous experiments in this series have shown that the following independent variables affect the approaching response: (a) presence or absence of food during training, (b) giving or withholding training trials, (c) fertilization processes in the paramecia, (d) change from light during training to darkness during final tests.

The present experiment asks whether giving more training trials of short duration will have a different effect than giving fewer trials of longer duration. Both young cultures recently fertilized by autogamy and aging cultures, in which autogamy was inhibited, were used. In one group, 42 training trials were given; in the other, 15 training trials. Time of trial, intertrial interval, and application of food were so adjusted as to give equal food and equal total time of exposure to wire, with total intertrial interval equal for all groups; i.e., some cultures had 42 training trials of short duration while other cultures received 15 training trials of longer duration. Each S was a culture of about 200 paramecia.

At better than the 1% level of confidence (by *t* test), it was found that with 15 training trials, young cultures gave more approach than aging cultures, but with 42 training trials, young and aging cultures were almost exactly equal. The young cultures showed no significant difference between effects of the two

training schedules, while for the aging cultures this difference was highly significant.

It seems, then, that wire approaching behavior can be induced in young cultures of *P. aurelia* with fewer training trials than are needed for aging cultures, but that increasing the number of training trials, other things equal, will not increase the response significantly at least within the limits tried in this experiment.

**Geller, Irving, Hunt, Howard F., & Brady, Joseph V.** (*Army Medical Service Graduate School and University of Chicago*) *The effect of electroconvulsive shock on a conditioned emotional response as a function of the temporal distribution of the treatments.* (Sponsor, Joseph V. Brady)

Previous research has demonstrated that 21 electroconvulsive shock treatments (ECS) administered 3 per day for 7 days can virtually eliminate a conditioned emotional response (CER) consisting of a cessation of lever pressing in a Skinner box upon presentation of a clicking noise. The present experiment investigates the effect of varying the temporal distribution of the treatments upon the attenuating effect of ECS on the CER.

Eighty-four male albino rats were trained in lever pressing and received 8 emotional conditioning trials, each trial consisting of a 3-min. presentation of a clicking noise terminated contiguously with shock to the feet. Then, the animals were divided into seven groups (12 rats each) and received 21 ECS according to the following schedule: Group I—1 ECS every second; Group II—1 ECS every ½ hour; Group III—1 ECS every hour; Group IV—1 ECS every 8 hours; Group V—1 ECS every 24 hours; Group VI—1 ECS every 48 hours; Group VII—1 ECS every 72 hours.

Two days after the last ECS treatment for each group, all animals were tested for retention of the CER. Groups III, IV, and V (1 ECS every hour, every 8 hours, and every 24 hours, respectively) showed virtually complete attenuation of the CER (i.e., pressed the lever through the clicker and did not defecate). Groups II, VI, and VII (1 ECS every ½ hour, every 48 hours, and every 72 hours, respectively) showed only partial attenuation of the CER. Group I (1 ECS every second) showed complete retention of the CER (i.e., defecated and stopped lever pressing during the clicker presentation).

The results of this experiment indicate quite clearly that the attenuating effect of ECS upon the CER is a function of the temporal distribution of the ECS treatments. The range of optimal effectiveness appears to be between 1 ECS every hour and 1 ECS every 24

hours, with treatments administered more or less often producing less attenuation of the CER. (Slides)

**Gerall, A. A., Green, R. F., Andreas, B. G., & Spragg, S. D. S.** (*University of Rochester*)  
**The effects on performance of changing display-control relationships in a complex motor coordination task.**

**PROBLEM:** The purpose of this study was to investigate the effects on performance of systematic variation of the relationship between the control cranks and the target follower movement on a two-hand coordination task. The experiment is part of a program of research on motor performance sponsored by Special Devices Center, Office of Naval Research.

**SUBJECTS:** 129 right-handed, naive military trainees.

**PROCEDURE:** After 14 practice trials on the SAM Two-Hand Coordination Test with the control cranks in a given arrangement, the relationship of the cranks to the target movement was modified systematically. For Group I, the position of one crank was changed; for Group II, the position of both cranks and the axes of target follower movement controlled by each crank were changed; for Group III, crank positions, the axes of the target follower movement controlled by each crank, and the direction of rotation of the cranks were changed; and for Group IV, axes, direction of rotation, and display-control continuity were changed. Four trials were given to each *S* on the modified task. Each trial lasted 1 min. with 30-sec. rest between trials.

**RESULTS AND CONCLUSIONS:** The standard measure of "time on target" was obtained for each trial for all *Ss*. Since the primary concern of the study was an evaluation of the modification in performance after change in the control cranks, the decrement in performance following the fourteenth trial was calculated for each group. It was found that the decrement in performance was related directly to the extent of change in the perceptual-motor relationships between tasks. An estimate of the importance of each change of the cranks in affecting transfer also was made. It appeared that a change in the continuity between the plane of rotation of the cranks and the direction of the target follower is more detrimental to performance than any of the other modifications.

**Gerard, Harold B.** (*New York University*) **The effects of differential status, role clarity, and goal clarity upon role expectations and experienced satisfaction.**

**PROBLEM:** To investigate some effects of differential status, role clarity, and goal clarity upon a group member's contribution to group process, his self-

estimated effectiveness, and his experienced satisfaction.

**SUBJECTS:** 192 male enlisted USAF personnel.

**PROCEDURE:** Through the use of appropriate instructions *Ss*, randomly assigned to four-person groups, were placed in exactly parallel situations. Each *S* believed that the other three were working together on a jig-saw puzzle and that he was the only one recording the progress of the group. Two degrees of each of the three experimental variables (relative status, role clarity, and group goal clarity) were created by verbal instructions yielding eight experimental treatments ( $2 \times 2 \times 2$ ). The *Ss* were seated in separate cubicles and coordinated their work by written messages. The notes actually written by *Ss* were intercepted by *E*. During the 15-min. work period each *S* received 15 standardized false notes, which purportedly came from the other three *Ss*. A questionnaire was administered after the work period.

**RESULTS AND CONCLUSIONS:** A difference in status results in distinguishable sets of role expectations which, in turn, interact uniquely with differential role and goal clarity. The high-status person tended to work more effectively when fewer restrictions were placed upon his role and when he had a wide range of possible activity. A low-status person, however, became more ineffective in an unclear group situation. The high-status person tended to derive greater satisfaction from group activity and consequently was more attracted to various aspects of the group situation. Low clarity of the individual's role led to a greater concern with evaluative criteria for individual rather than group performance. A set of assumptions and hypotheses is presented from which these data derive.

**Gerathewohl, Siegfried J.** (*USAF School of Aviation Medicine*) **Conspicuity of flashing light signals: effects of variation among frequency, duration, and contrast of the signals.**

**PROBLEM:** Light stimuli are frequently used as indicators. Warning signals, runway and approach lights, and orientational aids are seen under various visibility conditions. It has been demonstrated in earlier studies that the comparative conspicuity of flashing and steady lights differs considerably from their comparative visual effectiveness as measured by threshold visual effects or by apparent brightness above threshold. The objective of the experiments reported here was to study the effect of frequency, duration, and brightness contrast on the conspicuity of flashing light signals.

**PROCEDURE:** A Multiple Complex Reaction Test was used consisting of (a) flashing test signals of variable

intensity, frequency, and duration; (b) distracting light and sound stimuli; and (c) clocks for recording response time.

It was desired to compare 18 different light signals characterized by one of three contrasts (0.16, 0.95, and 11.16), one of three frequencies (1 flash every 3 sec., 1 flash per sec., and 3 flashes per sec.), and one of two flash durations (1/10 and 2/10 sec.). Two  $18 \times 18$  latin squares were used so that each of 18 observers viewed each signal. Thus not only the separate effects of the three variables were determined but also their joint effects on signal conspicuity.

**RESULTS:** Highly significant interactions were found for contrast and frequency. At either high contrast or high frequency a change of the other variables did not produce a significant alteration of conspicuity. At the lowest contrast, however, conspicuity increased as frequency increased; and with slow frequencies, conspicuity increased as contrast increased.

The results indicate that for Air Force application, the most effective signal tested so far is one flashing 3 times per sec., at least twice as bright as its background. (Slides)

**Gerjuoy, Herbert.** (*State University of Iowa*)

**The summation of paired-associate stimulus-response generalization effects.** (Sponsor, Harold Bechtoldt)

The term "paired-associate generalization effect" was defined as the difference between the value of a response measure when an S-R pair is trained alone and the value of that response measure when the same S-R pair is trained concurrently with other paired associates in a paired-associates list.

A formula was derived for predicting the "generalization effects" in a list of  $n$  items, basing the prediction on two sets of scores: (a) the response measures for each of the  $n$  items trained alone, and (b) the generalization effects for each possible two-item list formed by selecting two out of the  $n$  items.

The basic assumption underlying the derivation was that in an  $n$ -item list, when a given stimulus,  $S_i$ , is presented, the tendency to make one of the  $n - 1$  incorrect responses,  $R_k$ , has the same ratio to the tendency to make the correct response,  $R_i$ , as the ratio between the two tendencies in a two-item list consisting of  $S_i - R_i$  and  $S_k - R_k$  (where  $S_k$  is the stimulus for which  $R_k$  is the correct response).

It has been demonstrated that in at least one experimental situation the derived formula predicts results consistent both with common sense and the experimental outcome. Other studies are now in progress testing the proposed combination law under various more rigorous conditions.

**Gessner, Alan.** (*Rosewood State Training School and the Pennsylvania State University*) **Differential diagnosis of mental defectives of exogenous, endogenous, and unexplained etiology.**

**PROBLEM:** To determine differences among three groups of mental defectives on tests of intelligence, perception, and a behavior rating scale.

**SUBJECTS:** Three matched groups of 35 patients at the Rosewood State Training School. Subjects were classified on the basis of presence of mental deficiency in the family, educational and occupational level of parents and siblings, and presence of organic conditions known to cause mental deficiency. The CA range was 10-20, the MA range, 5-9.

**PROCEDURE:** Each patient was given the Stanford-Binet L, Wechsler-Bellevue I, PMA Primary, Graham-Kendall Designs, Stoelting Illusions, Tactual-Motor Test, Distracting Figure-Ground Designs, and the Strauss-Kephart Behavior Rating Scale. All tests were administered individually by the author, except the BRS which was scored by cottage supervisors.

**RESULTS:** All differences reported are significant at the 1% level. The endogenous and unexplained group patterns on the Binet were similar. The exogenous had fewer successes on memory and perception items. On the Wechsler-Bellevue, the three groups had similar mean weighted scores on all verbal tests except Digit Span, but the exogenous scored lower on the performance tests, especially Object Assembly and Digit Symbols. The PMA pattern was the same for all groups: P, V, Q, Mo, and S. The exogenous group had more distortions and figure-ground reversals on the perception tests, except on the Illusions, which failed to discriminate between the groups. The BRS showed the exogenous to be less socially accepted, more erratic, confused, clumsy, distractible, and undependable. The endogenous are more energetic, sociable, daydreaming, and reckless. The unexplained are more moderate, restrained, careful, and reliable.

**CONCLUSIONS:** Variability within groups was marked. Correlations between test scores showed a pattern of perception impairment and behavior problems generally associated with brain injury. The perception tests and BRS are seen as important adjuncts to intelligence tests in classification of mental defectives.

**Getzels, J. W.** *see* Guba, E. G.

**Ghent, Lila** *see* Weinstein, S.

**Gibb, Jack R., & Gorman, Anthony.** (*University of Colorado*) **Effects of induced polarization in small groups upon accuracy of perception.** (Sponsor, Jack R. Gibb)

**PROBLEM:** To test the hypothesis that induction of polarization in small groups will (a) increase the



incidence of defensive behavior, and (b) decrease the accuracy of interpersonal perception.

**SUBJECTS:** 160 college students, assigned to 20 eight-member groups, with groups matched for sex and scores on a pretest of social perception.

**PROCEDURES:** A pretest of interpersonal perceptiveness was given to each of 930 college students. Scores on the test were in terms of accuracy of estimation of opinions held by group members. Experimental groups were composed of individuals selected from the upper and lower extremes of the larger group (students with the top 96 and the bottom 96 scores). Each experimental group was composed of 4 persons scoring high on the test and 4 persons scoring low. Polarization was induced in 10 of the groups by planting experimental *Ss* trained in advance to maintain polarization during the major part of the discussion period. Plants in the 10 control groups were trained to minimize polarization by aiding the group to focus on problems and problem-solving procedures. Planted individuals were not included in the experimental data. Interaction category analyses gave independent indication of significant differences in polarization under the two conditions.

**RESULTS:** Defensive behavior was observed using interaction category analyses made during the discussion and from wire recordings. Perceptiveness was measured after each discussion in each of two ways: (a) deviations of *Ss*' rank ordering of the group from the median composite group rank ordering, (b) administration of a different form of the initial perceptiveness test. Polarized groups showed significantly greater errors in perceptiveness and significantly higher incidence of defensive behavior. An analysis is made of the differential effects of the polarization upon perceivers scoring high and low in the pretest. The relevance of findings to current theoretical positions is discussed.

**Gibson, W. A.** (*University of North Carolina*)

**Latent profile analysis: a new multivariate model.**

It can be shown that the product-moment, about the origin, of a set of  $n_q$  points having a zero product-moment about their centroid, is equal to the product-moment, about the origin, of  $n_q$  points placed at that centroid. This principle generalizes to triple- and higher-order product-moments. Hence it is conceivable that the correlation matrix and the higher-order product-moment matrices could be accounted for by a limited number of mutually exclusive subsamples, each being homogeneous enough, with respect to whatever underlying variables are involved, so that all product-moments of all orders within it are zero.

The equations which express this are:

$$1 = \frac{\sum_{i=1}^N 1}{N} = \frac{\sum_{q=1}^m n_q}{N},$$

$$0 = \frac{\sum_{i=1}^N Z_{ij}}{N} = \frac{\sum_{q=1}^m n_q Z_{qj}}{N},$$

$$r_{jk} = \frac{\sum_{i=1}^N Z_{ij} Z_{ik}}{N} = \frac{\sum_{q=1}^m n_q Z_{qj} Z_{qk}}{N},$$

$$r_{jkl} = \frac{\sum_{i=1}^N Z_{ij} Z_{ik} Z_{il}}{N} = \frac{\sum_{q=1}^m n_q Z_{qj} Z_{qk} Z_{ql}}{N},$$

etc., where, for example,  $Z_{ij}$  is the standard score of individual  $i$  on test  $j$ ,  $n_q$  is the number of people in subsample  $q$ , and  $Z_{qj}$  is the average standard score of subsample  $q$  on test  $j$ .

Because of a complete identity of form, these equations can be subjected to any method of solution for Lazarsfeld's latent structure equations to yield a set of latent parameters which is, in general, unique for a given battery of tests.

**Gilbert, Doris C., & Levinson, Daniel J.** (*Harvard University and Boston Psychopathic Hospital*)

**Studies in ideology: II. Ideology, personality, and system membership in mental hospital personnel.**

This study is concerned with the individual hospital worker's ideology about mental illness, seen in relation to his personality and his membership in a particular hospital and occupational role. Empirically, this involves: (a) The "custodialism-humanism" continuum of ideology, as measured by the Custodial Mental Illness Ideology (CMI) Scale; (b) the "authoritarian-equalitarian" continuum of personality, as measured by the F scale; (c) the "custodial-humanism" continuum of hospital and role policy: the study included a highly custodial, a humanistic, and an "intermediate" hospital, and four role groupings—attendants, student nurses, nurses, and doctors (in order of decreasing policy custodialism). Lastly, the 12 hospital-role units were ranked in order of increasing policy custodialism and each *S* was assigned an "index of policy custodialism" on the basis of the rank of his unit.

For the total sample ( $N = 335$ ), there is considerable variability in CMI and F scores. The rank order of the 12 hospital-role units on degree of policy custodialism correlates .92 with their rank order on mean CMI score, and .90 with mean F score; mean CMI

and mean F correlate .81. Thus, group policy, modal ideology, and modal personality are closely related.

We predicted that in the individual CMI would correlate significantly with F, and significantly but less closely with index of policy custodialism. The obtained CMI-F correlation was .71, while that between CMI and index of policy custodialism was .47. Finally, we predicted that even within single hospital-role units, individual ideology would vary in accord with personality. The obtained CMI-F correlations average .71 for the 12 units.

We have found significant variations in ideology both between and within the social systems studied. Both kinds of ideological variability are related to variations in personality. A theoretical framework for these findings will be presented. (Project supported by National Institute of Mental Health)

**Gilbert, Doris C.** *see* Levinson, Daniel J.

**Gilinsky, Alberta S.** *see* Diamond, A. Leonard

**Glock, Charles Y.** *see* Lennard, Henry L.

**Goldberg, Shepard, Hunt, Raymond G., Cohen, Walter, & Meadow, Arnold.** (*University of Buffalo*) **Some personality correlates of perceptual distortion in the direction of group conformity.** (Sponsor, Walter Cohen)

**PROBLEM:** To determine the personality determinants of perceptual distortion in a social group pressure conformity situation.

**SUBJECTS:** 76 resident undergraduate students at the University of Buffalo. Forty-one volunteers made up the experimental group, and 35 in an elementary psychology class served as controls.

**PROCEDURE:** MMPI scales of a group of Ss who distorted their perceptual judgments as a result of social pressure were compared with the scales of a group who did not distort their judgments in the same situation. The situation used was that described by Asch in his classic social conformity experiments. The 18 perceptual comparisons were first presented to a group of 35 Ss to determine how many errors in judgment occurred without the group pressure. Forty-one experimental Ss were tested following the procedure outlined by Asch. The MMPI scores of the Ss were grouped on the basis of conformity or nonconformity by a criterion based upon perceptual errors made by the control group. MMPI scores for the two groups were submitted to statistical tests to determine which personality variables were operative.

**RESULTS:** (a) The male conforming group was significantly lower on the Masculinity-Femininity scale, the Hypochondriacal scale, and the Psychasthenic scale, and the Taylor Manifest Anxiety Scale than the nonconforming male groups ( $p < .01$ ). Other MMPI

scales yielded no significant differences. (b) The female conforming group was significantly different on the Psychasthenic and Taylor scales, but the difference was in the reverse direction of the male conforming group. (c) Average K scores for conforming males were higher than for nonconforming males. Average K scores for conforming females were lower than for nonconforming females although neither of these differences was statistically significant.

**CONCLUSIONS:** The more deviant MMPI profiles yielded by the male nonconforming group are explained in terms of a tendency on the part of this group to present a better picture of themselves on the questionnaire-type personality test such as the MMPI. Conformity in a social situation may have a different psychological meaning for females in our culture.

**Goldiamond, Israel.** (*University of Chicago*) **The relation of subliminal perception to forced choice and psychophysical judgments, simultaneously obtained.**

That subjects can discriminate below-threshold stimuli raises the problem of discrimination without awareness. This problem may be resolved by considering guessing behavior and relationships between probability functions.

**SUBJECTS:** 36 male college students.

**PROCEDURE:** S sat in a light-controlled room (photopic) containing translucent windows left and right; a projector outside flashed a triangle into one. Polaroid rotation provided 8 intensities in  $64 \times 4$  randomized presentations, using a constant method. Curves have been analyzed for each S's statements of (a) confidence: degree of confidence in, (b) discrimination: which window contained the triangle, (c) psychophysical: was the stimulus seen (3 experimental groups: yes, no; stimulus intensity evaluated on 3- and 8-point scales).

**RESULTS:** (a) Classical psychophysical curves were obtained; i.e., the probability of reporting stimulus presence (or its orderly evaluation) is a function of stimulus intensity. (b) Discrimination and confidence curves similarly are intensity functions. (c) The discrimination curve for these Ss rises more quickly than the psychophysical; i.e., its inflection point (threshold) is at lower intensity.

**CONCLUSIONS:** 1. The data supporting subliminal perception, viz., that accuracy above chance occurs below the psychophysical threshold, are subsumed under the general statement that such discrimination occurs at all points on the psychophysical ogive whether above, below, or at that particular statistical point where the probability of reporting stimulus awareness is 50%.

2. The discrimination curve can be considered theoretically as the upper limit to the psychophysical curve, which can accordingly vary only downward in relation to it. Further, factors governing responses to probabilistic stimulation as in uncertainty situations (e.g., "playing it safe") may enter to make Ss establish criteria for reporting stimulus awareness that are higher than discriminatory criteria, especially in ambiguous stimulus-intensity regions. To the extent that these occur, there will be accentuated an impression of lesser sensitivity in one area (psychophysical awareness) than another (discrimination). (Slides)

Goldman, Morton *see* Lee, Francis J.

Goldstein, Allan C., & Beach, Frank A. (*Yale University*) **Electroconvulsive shock and mating behavior in the male rat.**

An experiment was performed to determine the effect of electroconvulsive shock on the mating behavior of male rats. Fourteen male rats of mixed strain and of varying sexual adequacy were subjected to a series of 12 electroshocks (one per day at 65 Ma. for 0.1 sec.). Stable measures of sexual performance had been established in the previous month during which animals were tested every fourth day. Tests were carried out after 4, 8, and 12 electroshocks, and every fourth day in the month following. Marked changes in performance were observed on the first shock trial, i.e., after 4 shocks. Three animals that had intromitted but not ejaculated in the preshock trials ejaculated during the shock trials. The other animals ejaculated in less time and with greater regularity than in the preshock trials. These changes tended to persist in the postshock trials. The time to effect the first intromission, however, increased during the shock trials, but returned to previous levels after the termination of electroshock. All the changes noted were statistically reliable. A follow-up study on males that were sexually inadequate (they showed no elements of the mating pattern in selection tests) failed to show the above changes, suggesting that electroshock influences sexual performance only above some minimal level of functioning. The relationship between the findings for mating behavior and for other functions will be discussed. (Slides)

Gollin, Eugene S., & Rosenberg, Sheldon. (*New York University and Brooklyn College*) **Concept formation and impressions of personality.**

**PROBLEM:** The general hypothesis tested in this study is that individual differences in concept formation are related to differences in the way in which impressions of personality are formed, and to differences in the

rejection or acceptance of persons as measured by a social distance scale.

**SUBJECTS:** 92 male and female Ss were obtained from summer session evening psychology classes.

**PROCEDURE:** To elicit differences in concept formation, the Rokeach interrelations task was presented to Ss affording them an opportunity to interrelate via a concept the 5 religious and 5 political-economic terms contained in the task.

To obtain data on formation of personality impressions Ss were shown a movie depicting a person behaving in socially approved and disapproved fashions. After viewing the movie, Ss wrote their impressions of personality. They then answered an 8-item social distance scale.

**RESULTS:** It was found that Ss who formed concepts in the interrelations task tended to write impressions of personality based on recognition of both the socially approved and disapproved behaviors shown in the movie. The Ss who did not form concepts tended to form impressions of personality that were based on recognition of one or the other behavioral theme, but not both. The difference between concept-formers and non-concept-formers was statistically significant.

No significant difference in mean social distance score was found between concept-formers and non-concept-formers. However, the social distance score variance of the concept-formers was significantly smaller than that of the non-concept-formers.

**CONCLUSIONS:** Under the conditions of this experiment a relationship is found between organizational tendencies in concept formation and the formation of impressions of personality, as well as social distance scale performance.

Golub, Gene H. (*University of Illinois*) **On the number of significant factors as determined by the method of maximum likelihood.**  
(Sponsor, Charles F. Wrigley)

**PROBLEM:** To investigate the practical value of Lawley's maximum likelihood method of factor analysis as modified by C. Radhakrishna Rao. The maximum likelihood solution has several statistically useful properties. It yields a likelihood criterion which makes it possible to test for the number of statistically significant factors. This process also leads to estimates of the communalities and factor loadings. Despite its statistical advantages, the method has seldom been used because of laboriousness of the computations. This paper reports the results of maximum likelihood analyses calculated on an electronic digital computer. **PROCEDURE:** Several well-known studies have been re-analyzed. A preliminary estimate was made of the number of factors and of the communalities. A determinantal equation of the form  $|A - \lambda\Delta| = 0$  was



solved repeatedly until the communalities converged to the desired degree of accuracy. At frequent intervals, a test of significance was made to determine the number of factors.

**RESULTS:** 1. The number of significant factors will be reported for these studies and compared with the number of factors given by (a) the original study, (b) Bartlett's test, (c) some empirical rules for stopping factoring. The maximum likelihood results will be shown to conform rather well with psychological expectations.

2. Because the iterative procedure converges slowly, ways of speeding convergence have been attempted. These methods have fallen into two categories: (a) extrapolation and (b) beginning with good estimates of the communalities. The squared multiple correlations of each variable with the other ( $p - 1$ ) variables provide a good estimate of the communalities that will lead to upper and lower bounds for the number of significant factors.

3. The communalities determined by this method will be compared with those used in the original study.

This research has been supported in part by the Office of Naval Research, Contract N6-ori-07130.

**Golub, Gene H.** *see* Wrigley, Charles

**Gonda, Thomas A.** *see* Fisher, Jerome

**Goodenough, Florence L.** *see* Harris, Dale B.

**Goodrich, David C.** (*University of Rochester*)  
**Aggression in the projective tests and group behavior of authoritarian and equalitarian subjects.**

**PROBLEM:** To investigate relationships between aggression as seen in projective personality tests and aggression as manifested in the group behavior of authoritarian and equalitarian Ss.

**SUBJECTS:** 64 male undergraduates with "normal" MMPI profiles were selected from 350 volunteers. Half the Ss (the "authoritarians") scored high on the California F scale; the other half (the "equalitarians") scored low. Each S scored on the appropriate side of Cattell's "conservatism-radicalism" scale.  
**PROCEDURE:** Four-man leaderless groups, homogeneous as to "authoritarian" or "equalitarian" composition, engaged in a discussion task of approximately 2½ hr. in a laboratory setting. Four Os classified the ongoing behavior of each group according to a system of group interaction categories and rated each S and group on relevant traits. These behavioral measures of aggression were correlated with Ss' Rosenzweig P-F and TAT need-press scores.

**RESULTS AND CONCLUSIONS:** Significant correlations

were found between aggression as shown in Ss' projective tests and in their group behavior. This was true, however, only in the authoritarians' data, even though the two sets of data were comparable as to reliability, variance, and range. The authoritarians seemed to have a greater homogeneity of character structure than did the equalitarians. Also, the leaders emerging in the authoritarian groups were more assertive than the leaders emerging in the equalitarian groups even though there were no significant behavioral differences between the remaining Ss as a whole.

Significant linear correlations were found between Rosenzweig P-F scores and differing manifestations of aggression in group behavior. The TAT yielded significant curvilinear (epsilons), but no linear, correlations with the behavioral measures.

The groups' mean rating on aggressiveness showed high, negative correlation with group productivity and morale.

Further details and implications of the above findings will be discussed.

This experiment was done at the University of Rochester under Contract N6onr-24, Task Order V, with the Office of Naval Research. (Slides)

**Gordon, M. H., Lindley, S. B., & May, R. B.**  
(*VA Hospital, Knoxville, Iowa*) **A criterion measure of within-hospital change in psychiatric illness.**

**PROBLEM:** Valid "measures" are sought to become parts of a satisfactory multiple criterion related to change in psychiatric illness among the so-called chronic patients of psychiatric hospitals.

Some patients fail to give a "scorable" set of responses to the usual psychological tests. Release from the hospital fails to tap a large enough proportion of these patients and misses registering gradual change. This study recommends a procedure for developing one reliable, objective, quantified criterion measure of apparently very high "face validity": The different wards to which patients are assigned while hospitalized represent serious, practical, medical staff decisions, based upon all available pertinent information.  
**SUBJECTS:** (a) 16 judges—representing different viewpoints among one hospital's supervisory personnel engaged in direct patient care and acquainted with this hospital as a whole. (b) The hospital's approximately 34 building-wards.

**PROCEDURE:** Each judge independently ranked the wards (indicated on cards) with respect to the "mental status of the average patient on the ward." Trial visit or better was given the single highest rank. Procedure was followed on two occasions, five months apart.

**RESULTS:** Interjudge agreement was quite high (Ken-

dall's  $W$  was .845,  $F$  81.8, on first occasion;  $W$  .771,  $F$  50.5, on second).

Agreement between occasions was very high. Rank-order correlation was .993. Product-moment  $r$  based on scale values, normalized by Guilford's method, was .991. Transformation seemed acceptable ( $tg_1$  1.87 and  $tg_2$  -.005 on first occasion;  $tg_1$  1.56 and  $tg_2$  .117 on second).

**CONCLUSIONS:** Scale was inferred acceptably reliable. When the values obtained from a scale like this are assigned to patients, statistical treatment would follow the distribution of values assigned to the patients and the operations by which the patients are sampled. Different hospitals would need to have developed for them their own scales. Several projects in which the scale is now being used are mentioned.

Gorman, Anthony *see* Gibb, Jack R.

Gottlieb, Sophie *see* Dudek, Stephanie

Gottsdanker, Robert M., & Edwards, Ralph V. (University of California, Santa Barbara College) **The prediction of collision.**

**PROBLEM:** To determine the variables operating and the accuracy attained when  $S$  predicts the future simultaneous positions of two targets that have been moving to a point of intersection.

**SUBJECTS:** Ten men, between the ages of 17 and 35.

**METHOD:** A pencil-and-paper tracking box was modified so that targets moving at right angles to one another could be generated. The appearance of the display was that of two targets moving down perpendicular "streets" toward the point of intersection. Both targets disappeared behind a "cloud" the same distance from the intersection. The  $S$ 's task on 100 trials was to indicate where the variable target would be at the instant the standard target would reach the intersection. In all cases the standard target moved at the same constant rate. Both constant-rate and positively-accelerated variable targets were used. Also, the "correct" prediction was sometimes behind and sometimes ahead of the intersection.

**RESULTS:** If predictions were based on continuing the motions of the two targets, they would have values of + (ahead) 2, - (behind) 1, +3, and -2 mm. for the four variable patterns employed (arbitrarily labeled J, K, L, and M). Predictions based on the position of the variable at the time of disappearance of the standard target would be -1, -2, -7, and -11 mm. The obtained mean predictions (of  $S$ s who made discriminating responses) were -2, -3, -7, and -10 mm. Position habits prevented the obtaining of valid measures of variability.

**CONCLUSIONS:** (a) Predictions were based on the positions of the targets at the time of judgment rather

than on the previous target motions. (b) Poor accuracy in the prediction of collision may be expected when the two targets differ in rate and acceleration. (c) There was a tendency to stereotype responses. (Slides)

Gough, Harrison G. (University of California, Berkeley) **Systematic validation of a test for delinquency.**

An adequate theory of delinquency cannot be an "either-or" theory, postulating a simple dichotomy between "delinquent" and "nondelinquent" personalities. The psychological conceptualization of delinquency must recognize gradations and degrees of variation; furthermore, these gradations must relate to, and accord with, the realities of the sociocultural environment.

Systematic validation of a measure of delinquency therefore requires the derivation of a sociologically defined continuum of nondelinquency to delinquency, and a checking of the psychometric index on samples representing various positions along this continuum.

The delinquency scale of the California Psychological Inventory was given to a sample of 3,285 males, ranging from nominated "best citizens," through men-in-general, through "disciplinary problems," to young delinquents and prisoners. A similarly defined sample of 3,999 females was tested.

For males, the following progression of mean scores was observed (scores are expressed as standard scores, with grand mean of 100 and standard deviation of 10): best citizens, 95; college students, 99; military officers, 100; prison guards, 100; high school students, 100; disciplinary problems, 110; military prisoners, 112; probationary young delinquents, 113; prison inmates, 114; training school inmates, 117.

For females, the progression was: best citizens, 96; college students, 100; high school students, 100; factory workers, 101; disciplinary problems, 110; prison inmates, 121.

The relationship between the psychological variable and the underlying sociological dimension is, therefore, the monotonic one required by the theory.

The degree of relationship can be estimated from a biserial correlation, pitting "nondelinquents" against "delinquents" for each sex. For males ( $N_1 = 2,843$ ,  $N_2 = 442$ ) this coefficient was .67. For females ( $N_1 = 3,601$ ,  $N_2 = 398$ ) the coefficient was .86. (Slides)

Gowan, J. C., & Gowan, May Seagoe. (Los Angeles State College and University of California, Los Angeles) **Intercorrelations and factor analyses of tests given teaching candidates at UCLA.**

The program of the Selection and Counseling Service of the Education Department at UCLA includes a

battery of tests given to all teaching candidates. Considerable experimentation has been done with various tests in an effort to discover those most helpful in predicting teaching success. This paper deals with intercorrelations between scales on the following tests: American Council Psychological (3 scales), Cooperative English Reading (4 scales), Stanford Arithmetic (1 scale), Allport-Vernon Study of Values (6 scales), Minnesota Multiphasic Personality Inventory (18 scales including validating, clinical, special, and experimental teacher prediction scales), California Psychological Inventory (19 scales), Guilford-Zimmerman Temperament Survey (10 scales). The paper also is concerned with factor analyses of certain minors of the resulting matrix of 59 variables.

The Ss were degree and teaching candidates in junior, senior, or graduate status. Numbers ranged from 1,700 to 240. Ratio of women to men was about 2 to 1. The 1,700 intercorrelations were secured with IBM cards by using Flanagan's method for converting the 27% high and low tails into correlation coefficients.

Results consist mainly of tables of correlations and factor loadings, which throw new light on the interrelationship between various scales. The nature of the emerging factors is discussed in relation to their value in the general selection program.

**Gowan, May Seagoe** (*University of California, Los Angeles*) **A follow-up of 314 students disqualified for teaching credentials at the University of California, Los Angeles, 1943-1953.**

Over the ten years, 213 women and 101 men undertaking a program of teacher training were referred to a committee representing the School of Education, University physician and psychiatrist, and the general faculty on the basis of physical or mental health defects. The committee discussed each case, often several times, and eventually cleared 110, rejected 138, and took no definitive action in 66 cases.

This study follows the cases in three ways. (a) Records of the five University and several public school offices concerned were checked for nature of the health problem, characteristic test profiles, student teaching record, issuance of credential, and placement. Progressively smaller proportions of the original 314 attained each of these stages. (b) A questionnaire was circulated to all cases to cover incomplete records due to transfer to other institutions, direct application to the state for the credential, and change of occupational objective. It covered related personal data, stage of training at which the teaching objective was given up, related health problems as of the date of training and at present, and reasons for leaving teaching. Reasons for leaving

were compared with a norm group from another study. (c) A trained observer visited 35 cases now teaching in near-by schools to judge classroom effectiveness, persistence of health defect in relation to teaching effectiveness, and principal's reaction to the teacher.

All three groups of data were analyzed according to type of health defect and committee decision. Physical and personality problems that eventually interfere with effective teaching and inferences for teacher selection are pointed out.

**Gowan, May Seagoe** *see* Gowan, J. C.

**Graham, Frances K.** (*School of Medicine, Washington University*) **Pain thresholds in the newborn: differences between normal and possibly brain-damaged groups.**

**PROBLEM:** This study is part of a continuing program to measure differences between normal newborns and those with varying conditions associated with brain damage.

**SUBJECTS:** Full-term infants. Normal group - 45 Ss; mild difficulty (at delivery) group - 21 Ss; possibly brain-damaged group - 14 Ss, including cases of anoxia, erythroblastosis fetalis, hypoglycemia, hyperthyroidism, and intracranial injury.

**PROCEDURE:** Faradic stimuli of controllable intensity were applied to the leg. With alternately ascending-descending series, four determinations were made of the stimulated leg.

**RESULTS:** (a) Reliability was established by the split-half and test-retest methods. Normal Ss show a small but consistent decrease in thresholds during the first five days. (b) The difference between normal and possibly brain-damaged groups is highly significant. None of the normal Ss but 71% of the possibly brain-damaged group had thresholds more than five sigma above the normal mean. The high thresholds persisted for varying numbers of days. (c) These abnormally high thresholds suggest impairment of the capacity to make a differentiated response since such Ss frequently responded with crying to mild stimuli, indicating perception of the stimulus, but failed to move the stimulated limb until very high intensities were reached. (d) Mild difficulty at delivery, including up to 3 minutes of apnea, did not raise the threshold significantly. However, differences approaching significance between cases given oxygen therapy and those not treated suggested that two factors were operating in opposed directions. This has led to further work as yet incomplete.

**CONCLUSIONS:** The pain threshold procedure appears to offer a promising tool for infant research. It is reliable, sensitive, and can be determined in about 10 minutes without endangering the ill infant. (Slides)



**Granick, Samuel.** (*VA Center, Biloxi, Mississippi*)  
**Intellectual performance as related to emotional instability in children.**

**PROBLEM:** Reviews of research on intellectual deficit generally conclude that such functioning is evident in organics, psychotics, and seniles, but for psychoneurotics the reported results are inconclusive. On the other hand, evidence from several studies suggests that a distinction does exist between emotionally stable and nonpsychotic persons in the use of their intellectual capacities. The present study aims to apply a closely controlled experimental design to discovering possible quantitative and qualitative differences on a battery of standard intelligence tests between emotionally stable children and others diagnosed as showing relatively mild personality disturbances.

**SUBJECTS:** (a) Two groups of 27 individually matched children for CA, MA, sex, race, socioeconomic status, health, and educational experience, with age range of 6-13. One group was psychiatrically evaluated as mildly psychoneurotic and the other was judged through tests and observations to be relatively stable emotionally. (b) A third, cross-check group, consisting of 65 psychoneurotic children, age range 6-13, located in a different city from the one in which the above groups lived.

**PROCEDURE:** Each child was administered individually the Revised Stanford-Binet, Form L, and the Cornell-Coxe Performance Ability Scale. The groups were compared for both quantitative and qualitative aspects of performance. The differences between the groups were also evaluated for definitiveness in differentiating the individual psychoneurotic from the emotionally stable S.

**RESULTS:** (a) No significant differences were found for the Stanford-Binet. (b) Cornell-Coxe performance significantly differentiated the stable from the psychoneurotic groups (.01 confidence level). (c) Specific Cornell-Coxe items differentiated the stable from the emotionally unstable groups both quantitatively and qualitatively. (d) Group differences did not lend themselves to the derivation of psychometric "signs" which could be applied to the individual S. (e) The results of this study, in relation to other research, imply that visual-motor tasks, such as block designs and memory for designs, may be sufficiently sensitive to serve as a means of diagnosing degree of emotional instability.

**Grayson, Harry M.** (*VA Neuropsychiatric Hospital*) **Evaluation of a brief group screening test for organic brain pathology.**

**PROBLEM:** To ascertain the effectiveness of a brief group-screening test of organic brain pathology.

**SUBJECTS:** 106 "chronic brain syndrome" patients; 57 epileptics; 25 schizophrenics; 35 patients with anxiety or depressive components; 37 "normals" (psychiatric aides); and 175 "neurological consult" cases.

**PROCEDURE:** Test performances were compared for all Ss, and percentages of correct identifications (organic vs. nonorganic) were computed. The neurological consult cases were included in order to see whether the test was capable of classifying the more difficult or borderline problems of differential diagnosis which had been referred to a neurological consultant.

**RESULTS:** Besides the quantitative test scores, certain qualitative features characterized the performance of organic patients, and these were utilized in interpreting test performance. The percentages of correct identifications ranged from 80 to 87 per cent for all groups except epileptics (52% organic) and the neurological consult cases (66% correct for organics and 71% correct for functional cases), the diagnosis being based on the total clinical picture, including history, EEG's where available, etc. Retreatment in terms of actual neurological findings raised the percentages to 81.6% correct for the neurologically positive cases and 76.8% correct for the neurologically negative cases.

**CONCLUSIONS:** The test seems to measure impairment of cognitive process which, in turn, seems related to the presence of positive neurological findings. Epileptic seizures are not necessarily accompanied by mental deterioration. (Slides)

**Green, R. F., Zimiles, H., & Spragg, S. D. S.** (*University of Rochester*) **The relative effects of certain degrees and patterns of knowledge of results on performance of a tactual-kinesthetic task.**

**PROBLEM:** The problem was to investigate the effects of giving different degrees and patterns of knowledge of results on learning and retention of skill on a simple motor task. This experiment is part of a program of research on motor performance sponsored by Special Devices Center, Office of Naval Research.

**SUBJECTS:** 140 military recruits, divided into seven groups.

**PROCEDURE:** Ss, blindfolded, were required to set a control knob so as to bisect a given angular extent (80°). Between certain settings, knowledge of results (verbal report by E) was given. Settings following information were designated I, and no information N. Each of two levels of information, limited and exact, was given in three patterns of trials: (A) NIIIII . . . ; (B) NININI . . . ; (C) NIINNI . . . Each of 6 groups had 30 trials on a given information-pattern condition, followed by 25

trials with no knowledge of results given. A seventh group had 30 trials with no knowledge of results followed by 25 trials with limited information.

**RESULTS:** Performance (measured by mean CE) was equally accurate with exact and with limited knowledge of results; it was, as expected, poorest with no knowledge of results. Performance on Pattern A was superior to that on C. B was not reliably different from either A or C.

On Trials 31-55 (after withdrawal of information) mean performance of the 6 groups was equivalent, and did not deteriorate following withdrawal of information. Variability of performance, however, increased to the level of initial performance with no knowledge of results.

**SUMMARY AND CONCLUSIONS:** Performance on this task is benefited by knowledge of results, but apparently *S* cannot utilize exact knowledge any better than limited knowledge of results. Whatever he does learn appears to persist for at least 25 trials after knowledge of results is withdrawn, although variability increases.

**Green, R. F.** *see* Gerall, A. A.

**Greene, Edward B.** (*Detroit, Michigan*) **Medical reports and selected MMPI items among employed adults.**

**PURPOSE:** To determine the correspondence of MMPI item scores and medical reports.

**POPULATION:** 238 persons referred to a diagnostic center because of illness. Of these, 10% were supervisors, 25% clerical, 20% skilled, and 45% semi-skilled.

**PROCEDURE:** The 550-item MMPI booklet and answer sheet was administered individually. Answers were compared with reports of medical examinations made during the same week.

**RESULTS:** 105 MMPI items were found which referred to specific symptoms in the medical reports for this group. The responses of each individual to the items which corresponded to his reported symptoms were tallied. There were 600 responses to 105 items. Of these, 66% confirmed and 34% apparently denied the medical findings.

Denials were more frequent for symptoms considered more serious, than for less serious. Denials were slightly less frequent among physical symptoms than among items referring to behavior or emotional balance. Percentage of denials were given by disease entities.

Reasons for these denials are not clear, but many employees doubtless wished to appear healthy and normal, so that they could continue to be employed. Some of the disagreements were doubtless of semantic origin.

Further studies are needed to determine what symptoms the employees claimed which were not reported by the doctors.

**CONCLUSION:** Among this group approximately one out of three symptoms reported by an examining physical was denied on the MMPI. The MMPI may be a valuable supplement since it gives some indication of the patients' self concepts in areas that are hard to diagnose.

**Greenspoon, Joel.** (*Pomona College*) **The effect of two nonverbal stimuli on the frequency of members of two verbal response classes.**

**PROBLEM:** The purpose of this experiment was to investigate the effects of two nonverbal stimuli, a 5-w. red light and a 190-cps tone, on the frequency of members of two verbal response classes, plural responses and nonplural responses.

**SUBJECTS:** 75 undergraduate students at Indiana University randomly assigned to five groups of 15 *Ss* each.

**PROCEDURE:** Each *S* served individually. The *S* was instructed to say words individually, excluding numbers. In one group each plural noun, a member of the plural response class, was followed by the light and in another group by the tone. In a third group each verbal response that was not a plural noun, the members of the nonplural response class, was followed by the light and in another group by the tone. No stimulus was introduced in the control group. The *Ss* responded for 50 min. The stimulus was introduced during the first 25 min. and omitted during the second 25 min.

**RESULTS:** The response measure was the number of plural or nonplural responses during successive 5-min. periods. Both stimuli resulted in significant differences in the mean frequency of the experimental and control groups for both response classes. When the stimuli were omitted, the frequency of members of both response classes declined to the level of the control group. None of the *Ss* whose data are reported was able to verbalize the relationship between the stimulus and the response class that it followed.

**CONCLUSIONS:** Both stimuli are reinforcing stimuli within the definition of a reinforcing stimulus as any stimulus introduced following a response which tends to increase the probability of occurrence of that response. (Slides)

**Gregg, Lee W.** (*Carnegie Institute of Technology*) **The effect of stimulus complexity on discriminative responses.**

A technique for quantifying stimulus complexity, derived from information theory concepts, was used to scale visual stimuli. The experiment reported here was designed to determine the nature of the relation-

ships between proficiency measures of discriminative performance and the quantified stimulus variable.

Reaction time and error measures were obtained for four groups of 24 Ss each. These groups differed with respect to a variable that has been identified by Fitts as "stimulus-response compatibility." The experimental session consisted of an acquisition phase in which Ss of each group received 48 trials in which the motor response, right or left movement of a joy-stick control, was associated with discriminations of horizontal spatial separation, vertical spatial separation, size, or brightness. An additional 96 trials in four blocks of 24 trials each followed in the transfer phase. The stimulus conditions for the blocks of 24 trials represented the four levels of stimulus complexity. Within each group, the stimulus conditions for the transfer phase were presented in sequences determined by the rows of a  $4 \times 4$  latin square.

The reaction-time measure showed that learning progressed rapidly and reached an asymptotic level for all groups within the initial 48 trials. There were significant differences in the over-all reaction-time means for the several groups, reflecting the differences in the stimulus-response compatibility relationships. The error measure yielded essentially the same results. In the transfer phase, reaction time was found to be a linear function of stimulus complexity. The same over-all group differences in reaction-time level were found as in the acquisition phase. The exact nature of the stimulus complexity functions was found to depend on the stimulus-response compatibility relations. Again, the error data gave similar results, but the differences indicated that the reaction-time measure was the more sensitive. (Slides)

Grodsky, Milton A., Cho, James B., & Davis, Roger T. (*University of South Dakota*)  
Paired-comparison scaling of the preferences of monkeys for nonfood stimuli. (Sponsor, Roger T. Davis)

PURPOSE: Two experiments were designed to attempt the scaling of choices made by monkeys for various nonfood stimuli.

SUBJECTS: 15 rhesus monkeys.

PROCEDURES AND RESULTS: Experiment I. The apparatus consists of a three-compartment stimulus choice box. End boxes shaped as 2.0-ft. cubes are connected by a narrow entry box. In the wall of each end box, opposite the entry box are 16 in.  $\times$  16 in. openings covered by stimulus panels. Eight panels containing various combinations of wood, wire, and visual exploration slits were paired and presented to each animal in three replications of all 64 possible combinations. The time spent in each box during 2-min. trials was recorded.

Analysis of the results showed significantly higher preferences for the four visual-slit conditions over the remaining conditions.

Experiment II. A pair of similar tubes each measuring 6.87 in.  $\times$  2 in.  $\times$  2 in. was mounted to project 4 in. into an animal's living cage. Twelve stimulus categories were evolved from the combinations of four kinds (wood, paper, cloth, and metal) and three forms (elongate, flat, and cylindrical) of stimuli. Each animal was individually given 156 stimulus pairs, the stimuli being placed singly in the rear of the tubes. Time taken to remove each stimulus was recorded during 1-min. trials. The order of preferences for the stimulus materials was, from most to least preferred: wood, paper, cloth, and metal. Initially, responses to elongate materials took five times as long as those to solid materials. With practice the order of preferences was nearly constant, but all times converged asymptotically.

CONCLUSIONS: The order of preferences of monkeys for nonfood objects varies between apparatus but not within apparatus conditions.

Guba, E. G., & Getzels, J. W. (*University of Chicago*) The construction of an other-directedness instrument, with some preliminary data on validity.

The relationship of Riesman's concepts of inner- and other-directedness to social behavior has been receiving considerable attention. Opportunity to test some of the formulations arose in connection with a study of role conflict in military service. Theoretical expectations were that the inner-directed personality should be relatively immune to conflict, while the other-directed personality should be conflict prone.

An instrument, designated as the I-O scale, consisting of 19 inner-directed and 19 other-directed items, based upon the theoretical and clinical materials presented by Riesman, was constructed. The items were of the slogan type (e.g., "Money talks.") and were responded to in terms of a six-point scale ranging from -3 (disagreement) to +3 (agreement). The scale was administered to 183 Air Force officers teaching at Air University, for whom role conflict and F-scale scores were also available.

Although the inner- and other-directed items had been expected to predict differentially to the role conflict score, the obtained data only partially substantiated this expectation. Indeed, both scales predicted positively and significantly to conflict, and the sum of the scales bore the same relationship ( $p < .01$ ). Analysis of the responses showed that Ss had apparently reacted to the demand quality of the slogans rather than to the content. Thus, the entire scale could be thought of as measuring suggestibility, a



crucial element in other-directedness, an interpretation supported by the fact that the total instrument predicted to conflict in the direction anticipated a priori for other-directedness.

In addition, the relationship of the I-O scale to the F scale, also said to be a measure of conformity and submissiveness, was studied. The upper I-O quartile was found to have significantly higher F scores than the lower quartile ( $p < .001$ ). This additional evidence for the applicability of the I-O scale to the measurement of suggestibility seems sufficient to warrant further research with instruments of this type. A reliability of .65 computed for the entire scale further supports this contention.

Guetzkow, Harold *see* Brožek, Josef

Gulliksen, Harold. (*Princeton University and Educational Testing Service*) **The measurement of value.**

Four different value laws are developed. These laws are:

The increase in value is: (a) inversely proportional to the *value level* already attained (a square root law); (b) inversely proportional to the *amount of the commodity* already possessed (a logarithmic law); (c) directly proportional to the difference between the asymptotic value level and the level already attained (a negative exponential law); and (d) a constant.

Assumption d gives an additive law expressed as  $V_i + V_j = V_{ij}$ .

The value of *i* plus the value of *j* equals the value of the "composite" object "*i* and *j* taken together." This rule can apply to either negative or positive values, or both.

Thurstone, Horst, and others have found that the additive law accounts adequately for various types of scaling data. In studying the indifference function, Thurstone found that the best fit was given by a logarithmic equation analogous to Fechner's law.

Methods are developed for testing the applicability of each of these four laws to a set of scaling data involving both single and "composite" objects, and applied to data on food preferences.

The procedure was to set up a paired-comparisons schedule involving both single items of food, and "composite items." These were given to a group of university students, and to an Air Force group. The items were scaled by a slight variant of the law of comparative judgment.

Each of the four laws of value increase was tested on these data. It was found that the additive law gave an amazingly good fit, while the other three laws gave results in marked disagreement with the data.

CONCLUSION: Methods have been developed for testing

the applicability to scaling data of several different value laws. Food preferences at least over a short range seem to follow an additive law.

This research was supported in part by the Office of Naval Research, United States Navy, under Contract No. N6onr-270-20 with Princeton University. (Slides)

Gunter, Laurie Martin *see* Roberts, S. Oliver

Gurewicz, Anne. (*Bryn Mawr College*) **The development of the self concept in children.** (Sponsor, Donald R. Brown)

Is ethnic self-identification simply a function of age, or does it vary with the sociological environment of the child? Four hundred and seventeen children, aged 3 through 11 years, were questioned. The children came from Protestant, Catholic, Jewish, and Negro homes, whose economic and educational status ranged from that of psychiatrists and business executives to that of unskilled laborers. Two private and two public schools were used.

The children were all asked 12 questions to determine the frames of reference used in identification of self and others. The crux of the problem lay in the two questions: "What are you?" and "What does it mean to be . . . ?" (answer to previous question). The number of ethnic responses given to the first question increased steadily with age, with a sharp rise from 8 to 9 years. There was no significant difference between the number of children in majority and minority groups identifying themselves ethnically. Many more majority group children, however, answered "I don't know" when asked what they meant by the ethnic term they used. Minority group children tended to define the term by some value it had for them, such as that it is "good to be Jewish." Although middle and lower class children had a much greater tendency to think of themselves in ethnic terms than did upper class children, for the former the term usually had no meaning that they could express. The latter were more likely to be able to explain what their ethnic self-identification meant to them.

As they grow older, children tend to identify themselves by increasingly abstract concepts. Ethnic self-identification increases directly with age, while ethnic identification of others does not. Age, race, religion, and socioeconomic level all affect ethnic self-identification, and its meaning to the individual child.

Gurvitz, Milton S. (*Hillside Hospital and Adelphi College*) **An experimental evaluation of judgment as measured by the comprehension subtest of the Wechsler-Bellevue.**

PROBLEM: Rappaport states that the Comprehension subtest in the Wechsler-Bellevue measures "judg-

ment." No explicit test of this hypothesis has been attempted.

**SUBJECTS:** The population consisted of three groups of 25 individuals equated closely for IQ, education, sex, socioeconomic status. The experimental group consisted of first offenders for the crime of embezzling money. They had led an exemplary life and had embezzled the money for good social reasons but exercised poor judgment in terms of their own social standards.

One control group consisted of embezzlers for asocial reasons such as gambling. This group exhibited poor judgment according to the standards of society but not according to their own antisocial standards. The third was a group of normals.

**PROCEDURE:** The groups were compared on a quantitative and qualitative level by chi square. A qualitative index was devised by relating the number of 2-level scores to the number of 1-level scores; the 2-level indicating a higher level of generalization.

**RESULTS:** The experimental group had a mean of 12.3, the prison controls, 14.6, and the normal controls, 14.9. The experimental group was significantly differentiated by the chi-square technique from the two control groups at the 2% level. On a qualitative basis the experimental and the normal control groups could not be differentiated by the chi-square technique, while the prison control group was significantly differentiated from the experimental group at the 5% level and from the normal control group at the 2% level.

**CONCLUSIONS:** The results substantiate the hypothesis that Comprehension can detect differences in judgment. When judgment was poor in terms of the individual's own standards this was indicated by a lowered total score. When judgment was poor only in terms of society's standards, qualitative differences were found. In clinically evaluating judgment not only must the act be considered, but also the individual's standards and motivations.

**Gurvitz, Milton S., & Feinberg, Leonard D.** (*Hillside Hospital and Adelphi College*) **Age and intellectual dimensions of the normal Rorschach.**

**PROBLEM:** Are Rorschach values dependent upon the factors of age and intelligence? At present no norms exist within the limits of a "normal" adult population.

**SUBJECTS:** The Rorschach was administered to three age groups: 20-24, 35-39, and 50-54. At each age level, three intellectual levels were tapped: the superior (minimum IQ 130), the average (IQ 90-110), and the inferior (IQ below 80). For each age group, 50 cases were tested for the three intellectual levels,

so that 150 cases were used at each age level and a total of 450 cases was amassed. All individuals tested were white and native-born.

**PROCEDURE:** On the basis of the Rorschach findings, tables were established for the basic Klopfer factors, central tendency, dispersion, and chi-square comparisons.

**RESULTS:** Norms are presented for all the basic Rorschach factors including number of responses, movement, color, shading, manner of approach, and other usual Rorschach ratios.

**CONCLUSIONS:** Our data point to the conclusion that the norms presently in use are based upon the adult of superior intelligence. A Rorschach record is interpretable only in terms of the subject's age and intelligence, preliminary norms for which are presented.

**Gurvitz, Milton S.** *see* Antinoph, Edwin L., Eichler, Herbert, Feinberg, Leonard D.

**Haber, William B.** (*Psychophysiological Laboratory, New York University College of Medicine*) **Effects of loss of limb on sensory function.**

**PROBLEM:** In normal limbs, tactile sensitivity is lowest in proximal portions (near trunk) and highest in distal portions (finger tips, toes). After amputation, however, sensitivity of remaining portions of limb is said to increase (Teuber *et al.*), so that sensitivity of stumps surpasses that of homologous parts of intact limbs and approaches that of distal portions. Our study was undertaken to check (a) whether stump sensitivity does increase, (b) if so, whether the increase is attributable (as claimed) to central rather than peripheral factors, and (c) whether extent of increase is related to particular types of "phantom" experience reported by the amputee.

**SUBJECTS:** 24 male veterans (World War II) with unilateral above-elbow amputations (12 right, 12 left). Twelve additional veterans, without amputation, served as controls. Sensitivity was tested in two regions of the stump (2.5 cm. from tip and 2.5 cm. from head of humerus), and in the two homologous regions of the sound limb. Corresponding areas were tested in controls. Thresholds were obtained in counterbalanced order, in all areas, for light touch (von Frey hairs), two-point discrimination, and point localization. A structured interview and questionnaire were used in assessing phantom experience, viz., the illusion of continued presence of part or all of the amputated limb.

**RESULTS:** 1. Stump sensitivity exceeded that of homologous parts of the sound limb on all three measures ( $p = .001$ , for light touch, two-point discrimination, point localization), with point localization giv-

ing the largest differences. No differences in sensitivity existed in the controls.

2. Increased stump sensitivity was unrelated to folding of skin, shrinkage, or other peripheral factors.

3. Central factors are suggested by the finding of better stump sensitivity, especially for point localization, in amputees who reported telescoped phantoms (phantom in or near stump) as compared with those whose phantoms had properties of a normal limb. (Slides)

**Haggerty, Helen R., Johnson, Cecil D., & King, Samuel H.** (*Personnel Research Branch, The Adjutant General's Office*) **Evaluation of ratings on combat performance of officers, obtained by mail.**

**PROBLEM:** A study was initiated, late in 1951, to study relationships between cadet performance on various U. S. Military Academy measures and graduates' subsequent success as company grade officers in combat. This paper reports results with particular reference to an evaluation of the combat criteria.

**PROCEDURE:** Success in combat was defined in terms of average ratings on three aspects of combat. Graduates of West Point classes of 1944-1950 who had served in Korea as company grade combat officers, mostly first lieutenants and captains, were both raters and ratees. Usable mail-order data were received from 159 rater officers, with one or more completed ratings for 337 ratee officers.

**RESULTS AND CONCLUSIONS:** Distributions and reliabilities of ratings obtained by mail approximated closely results obtained in face-to-face rating groups. Reliability coefficients (intraclass correlations corrected for number of raters) for rating scores on performance in positions of command leadership were .80 and .78 for officers in two samples. This finding particularly merits mention as many ratings were made months after the period of observation on which they were based and raters were encouraged to rate on the basis of combat reputation "... if you have confidence in the accuracy of what you have heard."

The predictability of these combat ratings is as high as found in other PRB studies where ratings on combat performance were obtained in person, or as high as for peacetime officer success criteria. In general, the same Academy variables predicted combat success as predicted peacetime success, and the magnitude of the relationships exceeded that found with peacetime criteria. The Academy measure of leadership, Aptitude for Service Ratings, correlated .50 with ratings on combat performance. Validities of other Academy measures were all under .30.

**Hagstrom, Earl C., & Pfaffmann, Carl.** (*Brown University*) **Taste stimulation by sugars.** (Sponsor, Carl Pfaffmann)

**PROBLEM:** Behavioral studies that use the preference method of determining taste thresholds have been criticized because the thresholds obtained are not exclusively a function of the taste receptor sensitivity, but, on the contrary, are influenced by post-ingestion factors. This criticism would be expected to hold most strongly for the nutritive sugars. The purpose of this study was to obtain a direct measure of the relative effectiveness of different sugars, without involving the so-called "gut" factors.

**SUBJECTS:** Albino rats of Wistar strain.

**PROCEDURE:** The chorda tympani nerve was dissected free in an anesthetized rat and placed on wick electrodes leading into a preamplifier, through a cathode ray oscilloscope and then to an integrating circuit and inkwriter. Application of solutions to the rat's tongue produces an asynchronous afferent nerve discharge. The relative magnitude of the discharge as registered on the integrator was taken as the measure of the taste effectiveness of equimolar chemical solutions.

**RESULTS:** A comparison of three sugars shows the following order of magnitude from the most to the least effective: sucrose, glucose, and maltose. While this is the same order found in relative sweetness for human subjects, just the reverse is reported in preference studies on rats.

**CONCLUSIONS:** From the above results it can be concluded that preference studies do not reflect sensitivity of taste receptors to different sugars. (Slides)

**Haire, Mason.** (*University of California, Berkeley*) **Role perceptions of labor and management.**

The paper reports two empirical studies of the role perceptions that labor and management have of one another. In one of the studies 108 members of management and 78 representatives of labor unions marked an adjective check list in a projective-type situation. The design of the study made it possible to parcel out the traits that were ascribed to labor by labor and by management and to management by labor and by management. The projective character of the test made it possible to collect this information without Ss being aware that their responses were to labor and management as such. The second study is a detailed interaction content analysis of verbatim transcripts of collective bargaining sessions for a period of two years. The analysis of these records makes it possible to extract a group of behavior patterns that characterize the behavior of each party with respect to the other.



When the same person is shown to the two groups, he is described very differently when he is seen as labor or management; further, this difference is a function of whether he is seen by labor or management. Among the dimensions along which differences occur importantly are aggressiveness, dependability, and ability to see the other's point of view. Labor and management tend to use the same general dimensions for viewing one another, but to ascribe different values to each party. In negotiation behavior, there are characteristic patterns. Management attacks labor's status, labor attacks management's good faith; management makes final statements, labor tentative; both sides show signs of a recognition of a lack of autonomy on labor's part; labor shows a reactive defensiveness (defending before attacked and much more than attacked), while management is relatively little defensive; both sides show signs of correctly perceiving the other's perception of himself.

The first study allows us to see, at a phenomenological level, something of the patterned perception of the parties; the second allows us to examine some of the responses (other than perceptual) that may be thought of as flowing from these role perceptions. In addition to the simple report of the kinds of perceptions and other responses shown, the paper considers the methods used to elicit these data and, briefly, the theoretical problem of the roles in labor-management relations. (Slides)

Hall, Norman B., Jr. *see* Saul, Ezra V.

Halpern, Howard. (*Teachers College, Columbia University*) **Some factors involved in empathy.**

This study is concerned with the relationship between empathic ability and (a) the similarity of the empathizer and his referent, (b) the role played by attribution, (c) the self-satisfaction of the empathizer in the empathy area, and (d) specific personality factors.

PROCEDURE: The Ss of this inquiry were 38 female student nurses in four groups. Within each group, Ss were long acquainted. They were first asked to rate themselves on an abbreviated Guilford-Martin GAMIN inventory. They were also to indicate if they were "pleased" or "dissatisfied" with themselves in the area represented by each item.

Each S's similarity to her fellow Ss was determined by counting the number of items that they answered in the same way. Two weeks later, each S was asked to predict the self-ratings of the two group members most similar and most dissimilar to herself.

RESULTS AND CONCLUSIONS: 1. A high positive relationship was found between predictive accuracy and

the similarity of the predictor and her referent ( $r = .84$ ).

2. The greater accuracy of forecasts made about similar referents was confined to items on which the predictor and referent had rated themselves the same way. This could be owing to either increased sensitivity in areas of similarity or correct attribution of the predictor's own characteristics to her referent.

3. Subjects predicted more accurately on items where they had indicated self-satisfaction rather than dissatisfaction. The rationale is offered that self-discontent, by arousing disorganizing anxiety and by precipitating the mobilization of distortive defenses, causes aberrations in empathy.

4. A significant correlation between empathy scores and femininity (as measured by the inventory) suggests a relationship between empathy and appropriate adjustment to sexual role. The findings concerning empathy and similarity indicate that the good empathizer has had the type of phenomenological experiences that, though wide in range, center about the group norm.

Halstead, Ward C. *see* Shure, Gerald H.

Hammock, Joseph C., & Prince, Albert L. (*Human Resources Research Office, George Washington University*) **Rifle marksmanship as a function of manifest anxiety and situational stress.** (Sponsor, George J. Wischner)

PROBLEM: Recent studies have shown manifest anxiety to be related to performance on diverse laboratory-type tasks. The present study investigated the relation of manifest anxiety to a complex military skill, rifle marksmanship, under both normal and situational-stress conditions.

SUBJECTS: 378 Army infantrymen.

PROCEDURE: Modifications of true-false and forced-choice forms of the Taylor Manifest Anxiety Scale were administered to all Ss. Those falling in the upper 20% (high anxiety) and the lower 20% (low anxiety) of the two distributions of scores were selected for rifle firing. These groups did not differ in general aptitude. A complex factorial design with one-fourth of each of the high- and low-anxiety groups firing in each of four firing sessions was used. Two sessions fired in a normal-stress sequence and two in the reverse order, one session of each pair firing before noon and one after noon. Stress conditions involved explosions which appeared to threaten the safety of the firer. Three measures of firing performance were obtained: standard target scores, horizontal and vertical coordinate positions of target hits, and behavioral ratings.

**RESULTS:** The high-anxiety group was less proficient than the low-anxiety group on every measure except one—rate of firing. Stress performance was for most measures poorer than normal performance; however, some of these comparisons were confounded by time of day. Performance was poorer under normal conditions following stress than under normal conditions preceding stress, suggesting a "conditioned stress" effect. There was no significant anxiety-stress or anxiety-conditioned stress interaction.

**CONCLUSIONS:** The negative relation of manifest anxiety to rifle marksmanship is consistent with the results of previous research on complex tasks.

The effects of the present stress conditions and conditioned stress are similar to those of high manifest anxiety.

The absence of anxiety-stress interactions suggests additive effects.

**Hardesty, Frank P.** (*Psychological Institute, University of Hamburg*) **An exploratory investigation of relationships between reaction-time characteristics on a word-association test and authoritarianism.** (Sponsor, Curt W. Bondy)

**PROBLEM:** It was the purpose of this study to investigate relationships between authoritarianism and reaction-time characteristics in performances on a word-association test.

**SUBJECTS:** Under conditions assuring anonymity, a representative sample of 396 students of the University of Hamburg were administered a scale on authoritarianism, and the upper and lower 15% of the distribution were solicited for further study. A word-association test was included in a battery of devices, and data were gathered on 23 high- and 31 low-scoring Ss.

**PROCEDURE:** In an attempt to ferret out relationships, comparisons were made between the two groups on the basis of (a) each S's median reaction time to the test as a whole, (b) mean time values for each of the stimuli, and (c) words entailing greatest preresponse hesitation for the more and less authoritarian groups.

**RESULTS AND CONCLUSIONS:** Inasmuch as differences between the two groups in terms of Ss' median reaction time obtained statistical significance, there seems to be evidence that a generalized slowness of response is associated with authoritarianism. Inspection of the mean time values for the individual stimuli revealed that the more authoritarian group's reaction time exceeded that of the less authoritarian group on 84 of the 90 words. Whereas greatest delay for the authoritarian group centered on stimuli connoting emotional states and self-related concepts, the less authoritarian Ss tended to be slowest in responding to stimuli pertaining to abstract social issues.

**Harris, Dale B., & Goodenough, Florence L.** (*University of Minnesota*) **Sex differences in children's drawing of a man.**

Data available from an extension and restandardization of the Goodenough Draw-A-Man test were examined to note sex differences in the drawing of the male figure. Drawings were obtained from samples of 100 children at each year of age from 5 to 16, stratified with respect to father's occupation to represent the occupational proportions of employed males in the 1950 census. On many drawing elements selected by the criteria of (a) age progression, (b) relationship to group tests of intelligence, and (c) internal consistency, sex differences consistent from age to age were found. Girls included many of the points in greater proportion than did boys. The statistical effect of these small differences was cumulative, so that significant differences obtained between total scores of boys and girls on the test. Data from children in other cultural groups are offered to support this finding in some instances but not in others. Certain of the differences suggest that personality factors may be operating to produce sex preferences for symbols. An alternative explanation may be found in the slight superiority of girls in attention to clerical detail, motor precision, and perhaps general maturity level. In the final standardization of the revised Goodenough drawing test, allowance is made for these differences rather than eliminating the differences by item selection. (Slides)

**Harris, Robert E., & Fisher, Jerome.** (*Institute of Personality Assessment and Research, University of California, Berkeley*) **Closure phenomena (Prägnanz) in social interaction.**

Individual differences in resistance to closure in memory and perception have been found to be correlated with certain personality dimensions. Can resistance to closure be demonstrated in social behavior? Is it a generalized dimension, and what are its relationships with variables describing other aspects of personality?

**SUBJECTS:** 100 USAF officers participated in some five days of assessment procedures. Scores are available on several hundred variables describing social behavior, perceptual-cognitive functioning, personality, and life history.

**METHOD:** In a modification of psychodrama utilizing a standard role player and incompletely synopsis plots, S was presented with a conflict of motives and values that required a choice between two alternative courses of action. The standard role player tested S's willingness to avoid simple solutions (closure). Behavior was recorded on rating scales describing the degree of acceptance of either or both alternatives,

and also plotted on a two-dimensional surface, the alternatives being placed at right angles to each other. Resistance to closure was defined as a large arithmetic product of the scores on two variables, and represented behaviorally as an effective compromise between the two variables. Closure was the acceptance of one alternative at the expense of the other.

RESULTS: 1. Resistance to closure in these situations and in perceptual measures shows some correlation, suggesting a generality of the function as a personality dimension.

2. Resistance to closure as measured by the product of scores on the two variables correlated with such personality variables as social poise, adaptive flexibility, and personal soundness.

3. Although not related to intelligence test scores, the measure of resistance to closure correlated substantially with a group of variables describing intellectual functioning: fluency of ideas, good judgment, and ability to communicate.

CONCLUSION: Correlations with personality and with perceptual-cognitive measures indicate that resistance to closure is a generalized dimension of personality. (Slides)

Harway, Norman I., Bordin, Edward S. (*University of Michigan*), & Dittman, Allen T. (*National Institute of Mental Health*) **Factors affecting the evaluation of depth of interpretation.**

In coding or rating of psychotherapy interviews, little attention has been given to those elements in the rating situation which may influence ratings. This paper reports one of a series of studies designed to elicit: (a) measurement conditions applicable to any therapeutic variable, (b) those specific to a single variable or given class of variables.

PROBLEM: This study investigated whether ratings of "depth of interpretation" were affected by varying three aspects of the rating task. Depth of interpretation was defined as the distance of a therapist's communication regarding the patient's emotions and motivations from the patient's awareness of them. Each aspect was investigated at two levels: (a) method of presentation of the interview to the rater—typescript versus tape recording; (b) unit of the interview to be rated—individual therapist response versus interview as a whole; (c) amount of information available to the rater—preceding interview with the total interview being rated versus only therapist responses in sequence from the interview being rated. Since rating depth requires knowledge of patient's perceptions, removal of patient responses should reduce interrater agreement.

SUBJECTS AND PROCEDURE: 16 psychotherapists rated interviews from four cases on an empirically derived,

seven-point scale. Analysis of variance was applied to data based on systematically ordered presentation of interviews and conditions.

RESULTS: (a) No differences for typescript versus recording. (b) Over-all ratings of an interview were "deeper" than the mean of individual therapist response ratings. (c) Expected differences in interrater agreement as a function of amount of information did not occur. However, when therapist responses were presented in random order to four additional raters, interrater agreement was markedly reduced. Given the sequence of therapist responses, raters are able apparently to make correct inferences regarding patient awareness of emotions and motivations. The implications of these findings for measurement problems as applied to the study of process in psychotherapy are discussed. (Slides)

Hathaway, Starke R., & Monachesi, Elio D. (*University of Minnesota*) **The occurrence of juvenile delinquency with patterns of maladjustment as exemplified in MMPI profiles.**

Two thousand boys in the ninth grade were tested with the MMPI. Four years later these Ss were checked for the occurrence of delinquency. By four years nearly one in three of the boys had been in some trouble with the law.

If we base the statements upon assumed comparability of MMPI profiles to those of adults, the findings indicate that over 30% of juvenile boys can be classed as moderately maladjusted. As might be expected, the highest delinquency rate occurred among those boys whose profiles indicated a psychopathic deviate pattern. Rates greater than 50% occurred with some classes characterized by the *Pd* scale. Boys with profiles dominated by high *Ma* were also somewhat prone to delinquency but not as much as might be expected from these active boys. A strong indication of delinquency was the combination of *Pd* and *Ma*.

Among boys with more neurotic patterns, the delinquency rate was less than the over-all rate. Depressed boys were less than half as likely to become delinquent as were boys in general, and less than a fifth as likely to become delinquent as those characterized by the *Pd* pattern. When *Mf* was dominant, the rate was very low.

The more psychotic-appearing patterns characterized by *Sc* and *Pa* did not seem generally related to delinquency except that a combination with *Pd* appreciably increased the probability of delinquency and the delinquent acts were worse.

The data indicate that various personality types lead to delinquency in different ways. It is suggested that prevention might more profitably be attempted by preliminary differentiation of boys into subgroupings and differential treatment of the subgroupings as



indicated by experience with the similar patterns of adult maladjustment.

An emphasis in the paper will be upon practical interpretation of MMPI profiles.

**Hauty, G. T., & Payne, R. B.** (*USAF School of Aviation Medicine*) **Mitigation of work decrement.**

**PROBLEM:** To determine the singular and joint effects of pharmacological and psychological conditions upon proficiency during a prolonged period of work at a complex perceptual motor task.

**SUBJECTS:** 168 young, male, Air Force basic trainees who, having been screened for recent inoculations and minor ailments, volunteered to participate in the investigation.

**PROCEDURE:** Following preliminary training, Ss were required to work at the task for a period of 7 hr. after having been randomly assigned to the 42 combinations of 7 pharmacologically induced analeptic and soporific conditions, 3 systems of presenting information of performance adequacy, and 2 differing proximities of goal. At the conclusion of this period, Ss performed a dissimilar perceptual-motor task for 16 min. and transferability of work impairment was appraised.

**RESULTS AND CONCLUSIONS:** 1. D-amphetamine (5 mg.) effectively mitigated work decrement for the entire period of 7 hr. and was as effective for this period as a multistage capsule which released equivalent dosages at 4-hr. intervals. A caffeine derivative was also effective but for a shorter period of time. The addition of d-amphetamine (5 mg.) to a preparation of diphenhydramine hydrochloride (50 mg.) and scopolamine (.65 mg.) had the desired effect of reducing but not eliminating the effects of sedation upon performance.

2. The greater efficiency of perceptual behavior afforded by supplementary signals resulted in a superiority of work proficiency which was sustained for the 7 hr. of work.

3. The pace of work effected by the more immediate goal resulted in superior work proficiency throughout the 7-hr. period.

4. Effects induced during the prolonged task were not transferred to performance of a dissimilar terminal task. (Slides)

**Helson, Harry, Judd, Deane B., & Warren, Martha H.** (*University of Texas, National Bureau of Standards, and Yale University*) **Prediction of color rendition with discontinuous types of energy distribution (fluorescent illuminants).**

**PROBLEM:** Good first-order predictions of hue, lightness, and saturation of object colors in continuous energy sources (tungsten filament) have been made

by taking into account the changed visual adaptation to the non daylight viewing conditions. Two problems arise: (a) Are formulations adequate for smooth energy distributions valid for discontinuous sources (fluorescent lamps), and (b) are the C.I.E. primaries adequate to account for all adaptive effects arising from diverse sources?

**PROCEDURE:** Five Os learned to identify Munsell chips under daylight illumination and then reported on 130 selected Munsell colors under 3500° K, 4500° K, and 6500° K fluorescent lighting.

**RESULTS:** A quantitative theory taking account of the changed adaptation from daylight and employing the copunctal points of the three types of dichromatic vision as primaries gave excellent predictions of hue with the exception of some colors in the blue region. Blues become greener than predicted in all three illuminants. Out of 30 possible changes in direction (10 major Munsell hues in the three illuminants), 25 are correctly predicted with only one of the five discrepancies statistically significant. Individual differences in observation are greater in the purple and red-purple regions than in the other hues. Present theory predicts somewhat greater loss in saturation than was actually observed.

**CONCLUSIONS:** The quantitative theory found adequate for continuous types of energy distribution is adequate for discontinuous types of sources. The C.I.E. primaries are probably not adequate for all regions of the hue circle, particularly the blue region. (Slides)

**Henneman, Richard H., & Long, Eugene R.** (*University of Virginia and University of North Carolina*) **The relative effectiveness of pre- and poststimulus setting cues as an aid to visual perception.**

The authors have suggested in previous papers that the effects usually attributed to perceptual "set" could be viewed as response restriction. Because of the chained or sequential nature of perceptual responses, the setting cues producing this restriction may be presented either before or after stimulus presentation. Earlier studies (employing distorted letters and words) yielded the surprising result that poststimulus setting was equal or superior to pre-stimulus setting in producing correct responses. Further laboratory investigations, however, indicate that under certain conditions prestimulus setting can be more effective than poststimulus setting. These investigations have involved location and identification responses, where stimulus ambiguity was produced either by distraction figures ("clutter") or by figural contour distortion. A typical experiment was the following.

**PROBLEM:** (a) Can location response uncertainty,

produced by "clutter" alone be effectively reduced by setting cues involving areal response restriction? (b) Is there a difference in the effectiveness of pre-stimulus and poststimulus cuing in the above perceptual situation?

SUBJECTS: 64 male college students.

PROCEDURE: Ss were required to locate a single geometrical figure added to a 64-cell square matrix already containing 16 or 32 other geometrical figures as confusion figures. Response restriction (setting) was produced by allowing Ss to view heavily outlined areas in printed copies of the matrix. These areas constituted the whole matrix, one-half of it, one-fourth of it, or one-eighth of it. Subjects were instructed that the added figure would fall only within the outlined area. One half of the Ss were cued both before and after stimulus presentation, the other half receiving only poststimulus cuing.

RESULTS: Correct location responses were increased by the areal cuing employed, and in proportion to the degree of response restriction. Pre- plus poststimulus setting was significantly more effective than poststimulus cuing alone.

CONCLUSION: These and other findings suggest certain principles determining the relative effectiveness of pre- and poststimulus setting. (Slides)

Henson, Jean B. *see* Garvey, W. D.

Heron, Alastair. (*Medical Research Council, London*) **Personality and occupational adjustment—a cross-validation study.**

PROBLEM: To ascertain what connection, if any, existed between personality variables and criteria of occupational success among men who, without previous experience, stayed a minimum of six months in the job of omnibus conductor.

SUBJECTS: Two groups of men ( $N$ 's = 78 and 66) between the ages of 17 and 45, still in employment after six months, the original populations having consisted of two randomly drawn groups of 105 men each.

PROCEDURE: Two criteria were specially established for the study, one being a measure of "job satisfaction," the other of "value to the employer." For each man, data were available on 20 personality variables, mainly objectively scored behavior tests.

For each group separately, product-moment inter-correlations were computed to produce two independent matrices. Partial correlations were then obtained between the two criterion variables and the 20 personality variables wherever this was necessitated by a significant correlation with age. Following upon the use of a somewhat unorthodox procedure for the preliminary selection of variables (to be described in the paper), separate multiple  $R$ 's were computed for

each group with the job satisfaction criterion, and the technique of "double cross-validation" applied.

RESULTS: Four of the personality variables together gave an average multiple  $R$  of .38 with the criterion of "job satisfaction." This figure is shown to be stable from one group to the other. No stable correlation between any of the personality variables and the criterion of "value to the employer" could be demonstrated.

CONCLUSIONS: This study appears to indicate the value of the two unorthodox methods employed as an economical means of obtaining a statistically reliable estimate of the multivariate relationships between a battery of personality measures and criteria of occupational success. (Slides)

Highland, Richard W. *see* Newman, Slater E.

Hinckley, E. D. *see* Rethlingshafer, D.

Hirsch, Richard S., & Carpenter, C. R. (*Pennsylvania State University*) **Effects of knowledge of test results on learning filmic material.**

PROBLEM: To determine the effects on learning of knowledge of results, differential effects of various methods of presenting this information by means of the Classroom Communicator, for tests based on the contents of selected informational films.

SUBJECTS: Six groups of NROTC midshipmen, a total of 123 men.

A latin-square design was employed to rotate groups, methods (of KOR), and tests. Analysis of variance was applied to the data obtained.

METHOD: With techniques available by use of the Classroom Communicator, four methods of presenting KOR were employed: (a) if  $S$  chose the correct answer to a question, a small lamp on his response station was lighted to signal his success; (b) all Ss, regardless of failure or success, were informed of the number of the correct choices; (c) the question was repeated with all but the correct choice deleted; and (d) in addition to c, the film was shown a second time. Two control methods were employed, both omitting KOR, but one presented the film a second time. The material of the tests was taken from six Navy training films.

RESULTS AND CONCLUSIONS: The most effective method was repetition of the question and its correct answer followed by a second film showing. Next most effective method was the same as the above without a second film showing. Next in order was the two film showings without KOR (control method). Least effective was the control method which neither repeated the film nor gave KOR. KOR by signs (lights and numbers) was better than no KOR but not as effective as a meaningful presentation of the knowl-

edge. The statistical and practical significance of the results will be discussed. (Slides)

**Hobart, Enid M., & Hovland, Carl I.** (*Yale University*) **The effect of "commitment" on opinion change following communication.**

Public commitment is generally considered a major factor contributing to the effectiveness of group decision in the Lewin researchers. But in the typical group-decision study many factors besides commitment are involved. The present study isolates the commitment variable by manipulating it experimentally in a communication setting. The hypothesis: public statement of one's position on an issue will make an individual more resistant to subsequent influence.

The communications concerned the desirability of lowering the voting age. Arguments on both sides of the issue were presented, one speaker presenting the arguments for the affirmative and another for the negative. Between the two opposing speeches the commitment variable was introduced. The "commitment" Ss wrote a short essay describing their opinion for publication under their signature in a school journal; the "control" Ss wrote a similar essay but without any expectation that others would know the authorship. Half of each group received arguments in an affirmative-negative order, while the other half had the negative-affirmative order. Ninety-eight high school students served as Ss.

The data indicated clearly that the commitment procedure increased Ss' resistance to influence by communication. The difference was primarily in the number of individuals changed in the direction of the communicator's position; the numbers changed in the opposed direction were approximately equal. An interesting additional finding was that the commitment Ss changed less from the position they held before the start of the experiment than the controls.

The implications of the results will be discussed in terms of the role of commitment for social-psychological theory and in terms of the methodological problems involved in utilizing "committing" measures of opinion in communications research.

The study was done as part of a coordinated research program being conducted by the Yale Communication Research Program. (Slides)

**Hoffman, Martin** *see* Sigel, Irving

**Hoffmann, Fredric K., & Calvin, Allen D.** (*Michigan State College*) **The effect of nondifferential reward and punishment in children.**  
(Sponsor, Allen D. Calvin)

**PROBLEM:** To study the effect of nondifferential reward and punishment in children.

**SUBJECTS:** 18 fifth- and 18 sixth-grade elementary school children.

**PROCEDURE:** Two identical cups were placed before S. If he selected the correct one, he was given a toy. Two stimulus cards which served as cues were placed directly in front of the cups. The Ss were divided into three groups of 12. Group I had to solve a standard discrimination problem. One stimulus card had three stars, the other four. Group II was given 20 trials in which a white card was negative and starred cards positive, i.e., on half the trials S found white vs. three starred and on the other half white vs. four starred, but the starred card was always positive. At the conclusion of their 20 trials on this problem, Ss from this group were switched to the problem Group I worked on. Group III was given 20 trials in which a white card was positive and the starred cards were negative, the reverse of Group II. At the conclusion of 20 trials this group also was switched to Group I's problem. A balanced experimental design was used for all groups.

**RESULTS:** The performance on the Group I problem from best to worst was as follows: Group III, Group II, Group I. Group I vs. Group III was significant beyond the 5% level. Group I vs. Groups II and III combined was significant beyond the 1% level.

**CONCLUSIONS:** Nondifferential reward and punishment both facilitate learning; however, only the non-differential punishment group performed significantly better than the controls. The relationship of these findings to Hull's concept of  $sH_R$  and previous work in this area is discussed.

**Holmes, Jack A.** (*University of California, Berkeley*) **A substrata analysis of spelling ability for elements of auditory images.**

**PROBLEM:** The purpose of this study was to discover the relationship between spelling ability, phonetics, intelligence, and the elements of auditory images.

**SUBJECTS:** One high school group of 227, and two university groups of 91 and 102 students were randomly selected as representative samples of their respective populations.

**PROCEDURE:** A dictation-write-in spelling test and a five-choice multiple-choice spelling test were used to assay the criterion. A 100-item phonetic association test, the ACE, the Holmes revision of the Kwalwasser-Dykema, and the Seashore Measure of Musical Talents tests were used to assay the dependent variables. A substrata multiple correlation analysis and contributions to variance were the major statistical techniques used.

**RESULTS:** For the high school group, phonetics and tonal movement accounted for 54 per cent of the variance. However, tonal movement, pitch, and in-



tensity together contributed 27 per cent to the variance of phonetic ability.

For the university groups, tonal memory and pitch made an 8 per cent contribution to the variance of dictation-write-in spelling ability over and above that type of proofreader visual spelling ability called upon in a multiple-choice spelling test. Both phonetics and *L* of the ACE made a substantial contribution to spelling ability. The *Q* of the ACE did not.

**CONCLUSIONS:** Whereas about 20 per cent of spelling ability at the high school level may be attributed to elements of auditory images, only about 10 per cent may be so accounted for at the university level.

Linguistic type of intelligence and training in phonetic association appear to be important substrata abilities for those who would be good spellers.

Those who manifest greater ability in phonetics also possess greater abilities in tonal movement, pitch, and intensity discriminations. (Slides)

**Holsopple, James Q.** *see* Lorr, Maurice

**Holtzman, Wayne H., & Bitterman, M. E.** (*University of Texas*) **Adjustment to stress: a factorial study of selected measures.**

**PROBLEM:** (a) To search for common factors in a wide variety of measures each of which was assumed on the basis of previous experimental work to bear on the fundamental problem of predicting adjustment to stress. (b) To examine hypotheses concerning the evaluation of personality by means of perceptual tests, several kinds of experimental stress tests, and measures of autonomic functioning.

**SUBJECTS:** 135 cadets in the AROTC unit at the University of Texas.

**PROCEDURES:** The investigation involved two sessions of individual tests and three of group tests. Sociometric data on officer aptitude were obtained for men in the junior class who attended AROTC summer camps. Represented in the battery were ratings of adjustment, officer aptitude, and anxiety proneness; both objective and projective personality tests; measures of performance in stressful situations; the conditioning of galvanic skin response; tests of size and shape constancy, orientation to the vertical, and tachistoscopic recognition of negatively valued materials; and selected biochemical constituents from samples of urine.

Preliminary cluster analyses of intratest variables reduced the number of measures included in the final correlation matrix from 101 to 41. Elimination of linearly dependent measures yielded a submatrix of 25 variables which was factor analyzed using Thurstone's centroid method.

**RESULTS:** Seven factors were obtained: Factor I was defined chiefly by measures derived from the ratings,

II by perceptual measures, III by variables derived from one of the stress tests, IV by conditioning measures, and V by psychometric measures; the meaning of VI was in doubt and VII appeared to be mainly a residual factor. In general, the degree of relationship among the measures derived from the different types of tests was low, although in many cases there were statistically significant and meaningful correlations between the laboratory variables and the psychometric and sociometric measures of personality. (Slides)

**Holtzman, Wayne H.** *see* Brown, William F.

**Hooker, Evelyn.** (*University of California, Los Angeles*) **An exploratory study of some characteristics of the "normal" overt male homosexual.**

**PROBLEM:** Few if any data are available on the overt male homosexual except in clinical populations. A stereotype is widely held concerning body build, occupation, and "femininity," as well as other characteristics of this group. The data that support this, insofar as there are any, may derive from studies of clinical cases. The problem of the present investigation was, therefore, to explore the validity of this stereotype by obtaining data from a group of overt male homosexuals who are nonclinical subjects.

**SUBJECTS:** 74 males, age range 22-50, volunteers from an organized group of homosexuals. All but one are gainfully employed and none was referred by court, clinic, psychiatrist, or psychologist. They are therefore referred to as nonclinical, or "normal" subjects. It is not assumed that the sample is typical of the total homosexual population.

**PROCEDURE:** An extensive personal data questionnaire (constructed for this purpose by the author), the Otis Self-Administering Intelligence Examination (Higher Form A), together with social attitude scales (which are not reported here), were administered to the total group in a group situation. Special precautions were taken to guarantee the anonymity of the individuals, and to secure maximum cooperation in answering personal questions.

**RESULTS AND CONCLUSIONS:** Data will be presented on occupation, body build, self-perceptions with respect to social and sexual roles and manner of dress, attitudes toward parents, and finally sexual preferences and aversions, to show that the stereotype of the male homosexual as an effeminate male does not correspond to many of the facts. On the contrary, he perceives himself as a man differing from heterosexual men only in his sexual object choice; and most of the objective data corroborate his perception. Exceptions to this will be discussed. Data will also be presented on political and religious affiliations.

**Hoppock, Robert** (*New York University*), & **Cuony, Edward R.** (*High School, Geneva, New York*) **Pretesting equated groups for experiments in vocational guidance.**

Experimental and control groups are usually assumed to be equated on all variables that might affect the criteria, but this assumption is seldom verified. In this experiment, three pairs of experimental and control groups were set up, no experimental variable was introduced, the groups were followed up and compared on the criteria after intervals of 20, 74, and 133 weeks. No significant differences were found. Then new experimental and control groups were set up in the same way, a course in Job Finding and Job Orientation was taught to the experimental group only, and both groups were followed up one year later. Significant differences appeared. Subjects in the experimental group were better satisfied with their jobs. There were 35 high school seniors in each group. Similar pretesting of equating procedures is recommended for future experiments.

**Horowitz, Milton J.** (*Western Reserve University School of Medicine*) **Student anxieties in the initial phases of medical education.**

**PROBLEM:** The aim of this study was to record the attitudes of freshmen medical students as revealed in small group discussions, with special reference to stresses in the learning of clinical science (interviewing methods, the doctor-patient relationship, the physical examination, and the study of a family).

**SUBJECTS:** Five groups of eight students (half the freshman class) at the Western Reserve University School of Medicine. These groups met with a preceptor (a practicing physician) twice weekly throughout the year. These meetings had the purpose of helping the student integrate the material presented in didactic sessions with his clinical experiences.

**PROCEDURE:** The verbal and nonverbal behavior in each group was observed and recorded. The recorders met regularly to systematize their observations and wrote quarterly summaries. At midyear and the end of the year the recorders met for three-day discussions. The findings were also analyzed independently.

**RESULTS:** The following were among the major areas found to evoke anxiety in learning: (a) clarifying the limits of responsibility and the faculty's expectations; (b) understanding one's role and status; (c) learning the standards of professional conduct; (d) overcoming individual biases and the tendency to identify with the patient in order to be objective; (e) how the doctor-patient relationship is similar to and different from other relationships; (f) the doctor's need for teamwork and for an understanding of a greater variety of subjects, e.g., emotional, social,

and economic factors in health and disease. One could ascertain how the students went about dealing with these problems.

**CONCLUSIONS:** The method of studying student attitudes toward medical education, with its concomitant stresses, by observing and recording regularly held, well-structured, purposive group learning situations was found to have considerable merit. By observing an ongoing learning situation one has the opportunity to appraise how the attitudes of the growing doctor develop.

**Horwitz, Murray** *see* Lee, Francis J.

**Hovland, Carl I.** *see* Cahill, Hugh E., Hobart, Enid M.

**Howard, Thomas W.** (*Southeast Louisiana Hospital*) **Diagnostic, physiological, and Rorschach indices of anxiety.**

Operationally, diagnostic, physiological, and Rorschach measurements constitute three different definitions of "anxiety." If these three measures do not correlate highly with each other, the practice of using them interchangeably, so common at the present time, is not legitimate.

The main purpose of this research was to determine the extent to which so-called measures of "free-floating" anxiety correlate with each other. A secondary, but important, purpose was to test the assumption of Rorschach workers that projective techniques yield maximum validity when the clinician uses his "clinical intuition" in addition to specific signs.

There were 84 white, male Ss. All of them were hospitalized for psychiatric disorders.

Each S's palmar sweating was measured by the Silverman-Powell colorimetric technique. The S's psychiatrist judged whether or not his patient was experiencing "free-floating" anxiety.

All Rorschachs were administered by the author. From the test responses and S's behavior during testing the author judged whether anxiety was present. A second Rorschach measure of anxiety was the number of K and/or k responses.

Three other clinicians examined the Rorschachs and judged whether indications of anxiety were present. Their judgments were made on varying amounts of data; proper controls were exercised to counterbalance individual differences among the judges.

Subject to the limitations of the design, the results indicate: (a) Physiological, diagnostic, and Rorschach measures of "anxiety" do not correlate enough to allow interchangeable usage. The highest positive correlation was .45, and there were some negative correlations. (b) The Rorschach measures

which correlated most highly with the criteria were the number of *K* and/or *k*. This does not support the hypothesis that an "intuitive" approach to projective techniques is more valuable than specific signs.

Hsu, Francis *see* Lord, Edith

Hull, Chester D. *see* Mount, George E.

Hunt, Howard F. *see* Geller, Irving

Hunt, Raymond G. *see* Goldberg, Shepard

Iscoe, Ira *see* Stevenson, Harold W.

Izard, Carroll E., & Rosenberg, Nathan. (*Tulane University*) Prediction of peer leadership ratings by forced-choice test under varied experimental conditions.

**PROBLEM:** A forced-choice personality test developed and keyed for leadership by the Personnel Research Branch of The Adjutant General's Office was validated ( $r = .35$ ) against aptitude-for-service ratings on West Point cadets. The present research investigated certain methodological problems in modifying this test for predicting peer leadership ratings.

**SUBJECTS AND PROCEDURE:** The original 420-item test was administered to 168 Naval Aviation Cadets. A short form consisting of the 106 keyed items was administered to another 332 cadets. These groups were tested during the thirteenth week of training and informed that results would be used only for research. Criterion data consisted of peer leadership ratings within subgroups of approximately 20 members each.

Test set was varied by informing 149 entering cadets who took the original test that scores might become a part of their official Navy record. Further, the short form was administered to ten psychologists with instructions to fake the test for leadership.

**RESULTS:** 1. The reliabilities for the original and short forms of the forced-choice test were estimated as .60 and .65, respectively. The corresponding validities for peer leadership ratings were .26 and .28.

2. The two forms did not differ significantly on reliability or validity.

3. Mean forced-choice scores obtained under different test sets including a "set-to-fake" were not significantly different.

**CONCLUSIONS:** (a) The original 420-item forced-choice test developed and keyed by PRB may be of general value for predicting military leadership potential. (b) A short form consisting of only the 106 keyed items may be administered with no significant loss in reliability or validity. (c) This forced-choice test is not readily susceptible to test set or faking.

Jacobson, Edmund. (*Laboratory for Clinical Physiology, Chicago*) An experimental and clinical approach leading to a present-day theory of the emotions. (Sponsor, Maurice H. Krout)

The problem underlying the investigations here reported is the character of emotional phenomena as revealed by data derived from certain (a) physiological, (b) psychological, and (c) clinical procedures. Considerably over 100 Ss were employed during (a) acute or transitory emotional states, (b) chronic emotional states, and (c) (relatively) nonemotional states (control tests). The Ss were trained in introspective observation. Physiological procedures included action-potential measurements with electrodes (a) in peripheral nerves or (b) in skeletal muscles of one arm, one leg, jaw region, and eye region. The physical procedures and control tests of similar action-potential studies have been described previously. Physiological procedures included also roentgenological studies of the esophagus, colon, or (less often) the stomach. In certain studies data were obtained with a balloon in the esophagus.

The findings indicate that typical emotional states, including fear, anxiety, surprise, and others, were approximately synchronous with specific muscular contractions, generally corresponding with the subjective reports of the patients. With relaxation of the muscular contractions, the emotional state diminished or disappeared. In subjects inclined to visualize, action-potentials from the eye regions along with subjective reports suggested that the visualizing process was an integral part of the total emotional experience. The muscular contractions seemed especially significant and purposive.

Our data need to be considered in the light of current knowledge not only of neurophysiology and of electroencephalography but also of the glandular, cardiovascular, urinogenital, and gastrointestinal systems, all of which apparently engage as a rule during emotional states. We conclude that emotional states are highly individuated and specific, and as such are concomitant with specific neuromuscular patterns together with the specific patterns present not only in the brain and vegetative nervous systems but also with those in other systems at the same moment. The views of Lange, James, and of Cannon appear as but fragmentary, incomplete, and at least partially inaccurate generalizations. (Slides)

Jaffe, Jack *see* Saul, Ezra V.

Jahnke, John C. *see* Cotton, John W.

Janis, Irving L. *see* Feierabend, Rosalind L.



**Jaspen, Nathan.** (*National League for Nursing*)  
Means and their standard errors.

**PROBLEM:** To obtain standard error formulas for the classical means (the best known being the arithmetic, harmonic, contraharmonic, geometric, and quadratic) and other minor means (such as the exponential and the inverse exponential).

**PROCEDURE:** Formulas for the standard errors of moments were developed by Karl Pearson. It can be shown that the sampling distributions of moments tend to normality. Approximate expressions can be obtained for the standard errors of functions of moments. A mean generating function was formed which served as a generalized mean. The problem of finding the standard errors of the minor means therefore reduced itself to expressing the generalized mean in terms of moment functions, and finding its standard error.

**RESULTS:** A general expression for the classical means is

$$M_1 = \left( \frac{\sum X^{k+T}}{\sum X^k} \right)^{1/T}$$

From this may be formed the arithmetic mean ( $k=0$ ,  $T=1$ ), the quadratic ( $k=0$ ,  $T=2$ ), the harmonic ( $k=-1$ ,  $T=1$ ), the contraharmonic ( $k=1$ ,  $T=1$ ), and the geometric ( $k=0$ ,  $T=0$ ). The standard error of  $M_1$  is

$$\sigma_{M_1} = \frac{1}{T \sum X^k} [M^{2-2T} \sum X^{2k+2T} - 2M^{2-T} \sum X^{2k+T} + M^2 \sum X^{2k}]^{1/2}$$

Both  $M_1$  and  $\sigma_{M_1}$  are indeterminate when  $k=0$  and  $T=0$ . These forms can be evaluated as the geometric mean and its standard error, respectively. A more direct procedure is to express the mean in a more general way

$$M_2 = T^{-1} \frac{\sum X^k T(X)}{\sum X^k},$$

where  $T(X)$  indicates a function of  $X$ , and  $T^{-1}$  indicates the inverse function. Then

$$\sigma_{M_2} = \frac{1}{dT(M) \sum X^k} [\sum X^{2k} T^2(X) - 2T(M) \sum X^{2k} T(X) + T^2(M) \sum X^{2k}]^{1/2}$$

In the case of the geometric mean,  $T(X) = \log X$ . For the exponential mean,  $T(X) = e^X$ . For the classical means,  $T(X) = X^T$ .

The parameter  $k$  defines the order of the implicit distribution.  $T$  has significance for transformations.

**Jenkins, Herbert M.** (*Massachusetts Institute of Technology*) Estimating an increase in visual number.

**PROBLEM:** This experiment extends previous work on visual numerosity judgments. The S's task was to estimate the number of dots added to a field of dots. Accuracy of estimation was studied as a function of both the number of dots added and the number of dots in the initial field.

**SUBJECTS:** College students; nine males, eleven females.

**PROCEDURE:** Random dot fields were photographed on film strips. The dots were projected as white circular areas on a dark ground. Two projectors were used in sequence to produce an initial field of dots and to add dots to this field. A field was presented for 2 sec. Additional dots were introduced at the end of the first second. The Ss estimated the number added which was varied through 9 values in the range from 0 to 12. The number of dots in the initial field was varied through 8 values in the range from 0 to 40. Five different dot fields were presented at each combination of values.

**RESULTS:** Estimation is most accurate when the initial field is blank. This is the standard condition for simple numerosity judgments. The presence of dots in the initial field has a masking or interference effect upon the estimation of the number added. The effect is noted as a systematic tendency to underestimate. When more than 4 dots are added, the mean error of underestimation is proportional to the product of the number added and the logarithm of the number of dots in the initial field. In other terms, for a given increment in number, the interference effect of the initial field is proportional to the logarithm of the number of dots in the initial field. The relation of this result to other data on numerosity judgments will be discussed.

The research in this paper was supported jointly by the Army, Navy, and Air Force under contract with the Massachusetts Institute of Technology. (Slides)

**Jenkins, Richard L.** (*VA Central Office*) The thalamo-cortical circulation of neural impulse.

Study of the effects of prefrontal lobotomy led to the following formulation: "The hypothesis is presented that the splitting of the schizophrenic process is the result of a conflict unresolvable to the patient, reflected on the psychological side by anxious preoccupation and on the neurological side by an unresolving morbid resonance or eddy of neural activity between cortex and diencephalon, which jams the higher circuits and leaves the control of behavior to lower centers capable only of stereotyped, inflexible, and defensive adjustments. Prefrontal lobotomy is presumed

to benefit the schizophrenic patient by destroying circuits involved in the maintenance of this morbid eddy or resonance and permitting him more effectively to integrate and use what he has left."

Review of the literature reveals that in 1929, George Campion concluded that a thalamocortical circulation of neural impulses is as fundamental for the neurology of thought as the conception of a circulation of the blood is for physiology.

The present paper is to emphasize that the conclusions of Campion explain many of the evident effects of general cortical deficit and specifically of frontal lobe deficit in previously normal individuals.

Cortical damage would tend to interfere with a feedback from cortex to thalamus which, by this hypothesis, is necessary for the continuity of thought processes. A natural result of such cortical damage is a reduction in the capacity for sustained attention, an unusual distractibility and stimulus dependence. Secondly, the reduced continuity of thought might be expected to result in a limitation of the associational range (Lidz), a diminished capacity for abstraction (Halstead), or impairment of the abstract attitude (Goldstein). It would explain the tendency of the lobotomized patient quickly to "run down" when asked to discuss himself (Freeman).

Jensen, Barry T. *see* Bornstein, Harry, Dunn, Theodore F.

Jensen, Milton B. (*VA Hospital, Salisbury, North Carolina*), & Schmid, John. (*Personnel and Training Research Center, Lackland AFB*) **An analysis of some clinical judgments on male basic airmen who failed the group psychological tests.**

An analysis was made of the data used in judging whether 660 men who failed the group psychological test batteries, AC-1B and AFQT, should be retained in or discharged from the Air Force. The variables studied were eight objective measurements consisting of race, size of home community, and low-level verbal and nonverbal intelligence and achievement tests, and eight subjective ratings of adjustment to factors such as school, society, and Air Force. These 16 variables collectively were used as a basis for retention in or discharge from the Air Force (considered as the criterion variable).

Regression analysis showed that only four of the 16 variables contributed substantially to the variability of the criterion. These were ratings of emotional adjustment, motivation for Air Force duty, Air Force adjustment, and behavior in examination. They contributed 74% of the total variability.

Three examiners independently estimated what each variable contributed to the criterion. Their agreements with the statistical analysis and with each other were low. They were unable to agree regarding what should be and what should not be used in recommending a man for discharge or retention, though they agreed highly as to which men should be retained and which should be discharged.

A bifactor analysis of the intercorrelations of all 16 variables and the criterion revealed no definitive structure. Bifactor analysis of the intercorrelation of the eight subjective ratings and the criterion revealed four definable group factors and one large general factor. Sixty-two per cent of the total variability of these nine ratings was accountable by one general factor.

In summary it may be said that prevailing conceptions about how easily a man may be rated as mentally fit for Air Force duty is not substantiated by a statistical analysis; also, such judgments probably involve relatively few discrete processes, even when many variables are available.

Jerison, Harry J. (*Aero Medical Laboratory, Wright-Patterson AFB*) **Paced performance on a complex counting task under noise and fatigue conditions.**

**PROBLEM:** This experiment is part of a program of research to determine performance variables that are adversely affected by high energy noise. It was specifically concerned with S's ability to keep track of a series of ongoing events under conditions of noise and quiet.

**SUBJECTS:** 24 male undergraduates.

**PROCEDURE:** S's task was to maintain three different counts simultaneously. This was effected by having S observe three lights flashing  $R_1$  times per minute ( $R_1 = 10$ ,  $R_2 = 4.5$ ,  $R_3 = 7$ ). The S was to press the key under a particular light every  $N$ th time that light flashed ( $N = 4, 7$ , or  $10$ ). This task (with one value of  $N$ ) was performed for an uninterrupted 2-hr. period. Twelve experimental Ss worked for 1 hr. of the 2-hr. period in white noise (110 db). Twelve control Ss worked only in relative quiet.

**RESULTS:** (a) There were statistically significant error increments with time. (b) Errors for the longest count ( $N = 10$ ) and for the slowest light ( $R = 4.5$ ) were most frequent and increased most rapidly with time. (c) A statistically significant difference in favor of the control group was found. The three lights were differentially effective in distinguishing between performances of the two groups. (d) A trend was present indicating that the groups became differentiated during the second half hour of performance under noise.

**CONCLUSIONS:** Ability to keep a "mental count" suffers under the conditions of this experiment. This performance deteriorates more in noise than in quiet. The deterioration may result from an increased "fatiguing rate" induced by the stress of noise or from a primary effect of noise itself. Result *b* indicates that longer temporal intervals between events make the task more susceptible to fatigue and noise, and suggests that a memory function may be involved. (Slides)

**Jessor, Richard, & Readio, Joel.** (*University of Colorado*) **The influence of the value of an event upon the expectancy of its occurrence.**

**PROBLEM:** The construct of expectancy occupies a central position in several theories of personality. Its utility depends upon specification of its properties and coordination to empirical variables. Rotter's social learning theory of personality states: "expectancy is independent of the value or importance of the external reinforcement." This hypothesis was investigated in the two studies reported here.

**SUBJECTS:** 90 fourth grade children of the Barnum School in Denver; 96 sophomores in introductory psychology at the University of Colorado.

**PROCEDURE:** The model for both experiments was to associate to the occurrence of a specific event differential value for different groups of Ss. Value was manipulated for the children by the amount of candy—one, three, or five pieces—awarded for hitting a screened target with a dart. For the sophomores, value was manipulated by the amount of money—nickel or dime—awarded for guessing correctly the circuit being selected by an "electronic randomizer selector." Both experiments employed 20 practice trials, and, in both experiments, the occurrence of the event—hitting the target or guessing the correct circuit—was under the control of *E*. Each study tested the effect of value on expectancy at two levels of objective probability, i.e., two different proportions of occurrence of the event during practice. After the twentieth trial, several measures of expectancy were obtained. These included verbal statements, probability scale ratings, proportion of winnings bet on outcome of next trial, and persistence in the task.

**RESULTS AND CONCLUSIONS:** No effects of value on expectancy were found in the study with children. With the sophomores, the dime group shows a stronger expectancy than the nickel group on one measure ( $.10 > p > .05$ ). The experiments will be compared, and the significance, for expectancy theories of personality, of the present methodology and results will be discussed. The independence of expectancy from the value of the event remains questionable.

**Johnson, Cecil D., & Roy, Howard L.** (*Personnel Research Branch, The Adjutant General's Office*) **The use of a "carelessness" key to refine analysis samples.**

**PROBLEM:** This study was designed to develop keys to detect irrelevant or careless responses to personality tests. Such keys would provide a basis for refining samples used in validating experimental tests. It is an outgrowth of results obtained when a personality test was administered to enlisted men of two regiments in Korea under widely differing conditions of testing. Judgment keys constructed to predict a criterion of combat effectiveness had fair success in the regiment test in rest camp. These keys failed completely in the regiment tested under less favorable conditions (on the combat line).

**PROCEDURE:** Two keys designed to detect careless marking (random responses) were constructed. A "frequency" key consisted of items to which nearly all subjects respond in the same way. A "consistency" key included pairs of yes-no items (presented separately) so stated that a given response to the first member of the pair dictated the logically consistent response to the other member. Both frequency and consistency keys were applied to the papers of the two regiments.

**RESULTS AND CONCLUSIONS:** The two carelessness keys intercorrelated highly within both regiments (.73 and .74) indicating agreement of the two approaches. Subjects with high carelessness scores tend to have near-chance BIB scores. The combined carelessness key also correlated highly (negatively) with the initial judgment key. The carelessness key correlated zero with the criterion in the regiment where carelessness is explainable by testing conditions, but is moderately correlated ( $r = .19$ ) in the regiment where the conditions do not engender careless marking. The use of the same cutoff score on the combined carelessness key for the two regiments eliminated 22% of the papers from the "careless" regiment and 10% from the "careful" regiment. The validities of the judgment keys were recomputed on refined samples and items were reanalyzed to form new empirical keys.

**Johnson, Cecil D.** *see* Haggerty, Helen R.

**Jones, F. Nowell.** (*University of California, Los Angeles*) **An analysis of individual differences in olfactory sensitivity.**

Despite considerable theorizing, the task of discovering the relevant variables in olfactory stimulation still remains. The present study aims at the formation of testable hypotheses concerning relevant stimulus dimensions by means of the factorial analysis of indi-



vidual threshold differences. Absolute thresholds for 20 pure substances were obtained for a sample of 96 Ss, of whom 84 were useful for this analysis. The apparatus used presented S with a gentle blast of odorous air in which pressure, volume, and temperature were constant, but the concentration of odor was variable. Experimentation was carried out in a temperature-controlled room ventilated with charcoal filtered air. Stimulus substances were chosen on the basis of availability in pure form, availability of physical data, of liquid state at 26° C., and theoretical interest. The resulting thresholds were intercorrelated and subjected to a centroid factor analysis. After extraction of factors to one more than required by Tucker's criterion, the resulting four factors were rotated to simple orthogonal structure. These four factors may be identified by the two highest and two lowest loadings for each. Factor I, highest: pyridine and butyric acid; lowest: amyl acetate and cyclohexane; Factor II, highest: isobutanol and n-propanol; lowest: pyridine and butyric acid; Factor III, highest: ethyl acetate and n-propanol; lowest: methyl salicylate and saffrole; Factor IV, highest: methyl salicylate and n-caprylic acid; lowest: ethylene chloride and ethyl acetate. Consideration of series and pairings in the test substances reveals certain points of interest, particularly the lack of apparent effect of saturation in the case of benzene and cyclohexane, the effect of chain length in caprylic and butyric acids, and the effect of substituted radical position in a series of butanols. It is concluded that there are systematic individual differences in olfactory sensitivity which are revealed by statistical analysis, and that research on series of substances based on this analysis is indicated, as well as the extension of the method to include other odors. (Slides)

**Jones, Marshall B.** (*U. S. Naval School of Aviation Medicine*) **Authoritarianism and intolerance of fluctuation.** (Sponsor, Wilse B. Webb)

**PROBLEM:** Authoritarians are generally supposed to be intolerant of ambiguity. Since fluctuation of its very nature prevents the unambiguous organization of the perceptual field, authoritarians should also be intolerant of fluctuation. Whether or not they are constitutes the concern of the present paper.

**PROCEDURE:** Two groups of 251 and 152 Naval Aviation Cadets participated as Ss. The measures adopted were fluctuation of the Necker Cube and the California F scale. To the first group the Necker Cube was presented in two forms: on a board held before the Ss and on sheets distributed among them. All members of the first group were administered the cube on the board while only the last 122 were given the

cube on the sheets; all members of the second group were administered the cube on the sheets only. An administration of the Necker Cube in both forms and in both groups involved two 15-sec. trials during which Ss simply counted the number of reversals they experienced. The first group was instructed to make the cube reverse, while the second was instructed to keep the cube still.

**RESULTS:** In the first group rank correlations of  $-.14$  for the cube on the board and  $-.16$  for the cube on the sheets obtained with F. These were significant at the .001 and .01 levels, respectively. In the second group a rank correlation of  $-.02$  obtained.

**CONCLUSIONS:** From the results we may fairly conclude that authoritarians are intolerant of fluctuation, i.e., capable of low rates of fluctuation only; while nonauthoritarians are tolerant of fluctuation, i.e., capable of high or low rates of fluctuation more or less as instructed.

**Jourard, Sidney M., & Secord, Paul F.** (*Emory University*) **Body-cathexis and the ideal female figure.**

**PROBLEM:** To determine the relationships between cathexis ratings for selected body parts, and three expressions of the size of those parts: measured size, self-estimated size, and self-ratings of ideal size. **Hypotheses:** (a) Cathexis ratings are correlated with measured and estimated size and with the magnitude of deviations between measured size and ideal size. (b) Self-ratings of ideal size, as a cultural stereotype, are much less variable than direct measures of size.

**SUBJECTS:** 60 female college students, mean age 22.79 years, range 18-36, and *SD* 4.25.

**PROCEDURE:** Ss signified their satisfaction-dissatisfaction on a seven point Body-Cathexis scale concerning their height, weight, bust, waist, hips, thighs, calves, ankles, feet, nose length, shoulder width, and neck length. Each body aspect was directly measured, and size estimates and self-ratings of ideal size obtained.

**RESULTS:** Significant correlations were obtained between cathexis ratings and body measurements. The direction of seven of the *r*'s signified that small size was correlated with satisfaction, while for bust, large size seemed desirable. Desirability of small size was further supported by significant *t* ratios for a comparison between mean measured size and mean ideal size. Deviation between measured and ideal size correlated still more highly with cathexis ratings, suggesting the existence of personal ideals deviating somewhat from the cultural stereotype. Finally, *SD*'s for ideal size ratings were significantly smaller than *SD*'s for measured size.

**CONCLUSIONS:** There appears to be a shared ideal for the size of the female figure. Female Ss vary their cathexis ratings for aspects of their bodies as they approach or deviate from their conception of this ideal.

Judd, Deane B. *see* Helson, Harry

Kahn, A. *see* Taylor, F. V.

**Kahn, Robert L., & Weinstein, Edwin A.** (*Department of Neurology, Mount Sinai Hospital*)  
**Patterns of intellectual functioning in "irritative" lesions.** (Sponsor, Robert L. Kahn)

**PROBLEM:** To resolve the conflicting and paradoxical findings reported in the literature on the relation of brain lesions and intellectual functioning, Hebb has advanced the hypothesis that it is the "irritative" effects of a lesion on surrounding or remote tissue which may be significantly related to the presence and type of disturbance in function. He has suggested the use of the electroencephalogram as an index of "irritation."

**METHOD:** To test this hypothesis 139 patients with definitive evidence of organic disease of the brain were given an EEG and tested on the Wechsler-Bellevue. On the basis of quantitative analysis, and using conservative criteria, the EEG's were classified into 49 normal and 90 abnormal records. The abnormal records were further divided according to three dichotomous variables: relatively high or low abnormality, asymmetrical or symmetrical slow wave activity, and presence or absence of some bursts.

**RESULTS:** No significant differences were found between the normal and abnormal EEG groups. When the abnormal cases, however, were subdivided according to the other variables, the largest and greatest number of significant differences were found between the asymmetrical and symmetrical groups. The former did better on verbal tests, had greater intertest scatter, and showed a pattern most like that commonly described as occurring with brain disease. The symmetrical cases did better on performance tests and were otherwise contrary to the pattern usually reported for brain disease. Each differed in many respects from the normal EEG group.

**CONCLUSIONS:** On the assumption that an abnormal EEG reflects an "irritative" lesion, the factor of "irritation" by itself is not related to differences in behavior. The pattern of intellectual functioning will vary, however, according to the type of "irritative" process as manifested by the pattern of electroencephalographic abnormality. (Slides)

Kahn, Robert L. *see* Battersby, W. S., Weinstein, Edwin A.

**Kalish, H. I., Bleke, R. C., Garmezy, N., & Rodnick, E. H.** (*Duke University*) **Effects of anxiety and experimentally-induced stress upon verbal learning.**

To investigate the effects of experimentally-induced stress and anxiety upon verbal learning, 40 high A and 40 low A Ss, selected from extreme scores on the Taylor anxiety scale, were divided into four groups: high and low A stress, high and low A nonstress.

Before a practice list was administered, Ss under stress were informed that performance in verbal learning is highly correlated with intelligence. After practice they were told that their performance was below the average for college students; then they learned a list of 12 nonsense syllables of low similarity and low association by the method of anticipation. The Ss in the nonstress condition were merely instructed to learn the list.

For nonstress Ss no significant differences were obtained between the high and low A groups for number of trials to reach criterion, number of errors, or shape of the serial order position curves. These results extend Montague's findings with regard to the performance of high and low A Ss in verbal learning. The results for the groups under stress indicated that the high A group required significantly fewer trials to reach criterion, made fewer errors, and exhibited a depressed serial order position curve. Comparison of these serial curves indicated that both the high and low A groups under stress manifested significantly fewer errors for the first four syllables than the high and low A groups under nonstress. For the last four syllables, however, the low A stress group made a significantly greater number of errors than the high A stress group; the nonstress groups fell in an intermediate position between the two stress groups.

This analysis of serial order effects supports an interpretation of anxiety and stress in terms of interfering response tendencies.

The research was aided by National Institute of Mental Health grant M-269. (Slides)

**Kallmann, Franz J., Aschner, Bertha, & Falek, Arthur.** (*Department of Medical Genetics, New York State Psychiatric Institute, Columbia University*) **Follow-up report on the comparative survival values of senescent twin families.**

**PROBLEM:** As part of a longitudinal study of senescent twin index sibships (seventh progress report), the problem of a possible genetic basis of longevity and other biological survival values has been approached in two different ways: (a) by comparing the life spans of one-egg and two-egg twin pairs, and (b) by evaluating the influence of the life spans of the

parents on those of senescent twin index cases over age 60 and their siblings.

**POPULATION:** A representative series of 174 one-egg and two-egg twin pairs of the same sex, taken from a sample of 2,200 senescent twin index cases and fully observed until the end of their lives (for analysis of intrapair differences in longevity), and a series of 1,429 senescent twin index sibship (for analysis of intrafamily differences in life spans).

**PROCEDURE:** In addition to an up-to-date analysis of the intrapair life span differences in all same-sexed pairs with two deceased members, a comparison has been made between the life spans of senescent twins and those of their fathers, mothers, and siblings. The data will be compared with those of Jalavisto and Von Verschuer.

**RESULTS:** The mean intrapair life span differences in one-egg pairs (76) continue to be significantly smaller than those in two-egg pairs (98). In line with this finding, evidence of a sex-independent influence of the life spans of the parents on those of their offspring has been obtained.

**CONCLUSION:** The genetic theory of the capacity for longevity and senescent health potentials has been further substantiated. (Slides)

**Kaplan, Harry, & Berkhouse, Rudolph G.** (*Personnel Research Branch, The Adjutant General's Office*) **Survey of the literature on measurement of oral fluency in foreign languages.**

**PURPOSE:** The Army has initiated research to develop tests that measure proficiency in speaking foreign languages. The objective of the first study in this program was to survey the literature on measurement of oral fluency in foreign languages for tests and testing techniques applicable to Army needs. The tests of speaking ability are to supplement existing Army foreign language proficiency tests which are designed to measure proficiency in reading, in writing, and in understanding the spoken language.

**DISCUSSION:** The literature survey discussed the three following influences on foreign language test construction:

1. The needs of foreign language teachers: Prior to World War II, these formal classroom needs were primarily for paper-and-pencil tests dealing with formal aspects of the written language. During World War II, intensive language teaching programs of the armed services shifted the emphasis to oral-aural skills—a shift carried over into postwar civilian education. As a result of this new emphasis, construction of oral fluency tests was begun. These include tests of English as a foreign language.

2. The psychological testing movement: Established principles and techniques for construction and analy-

sis of achievement tests have been used to develop objective, standardized, group, paper-and-pencil tests in foreign languages. As yet, however, there is no comparable rationale for oral tests.

3. Linguistic theory: Although test content has been influenced by developments in linguistic theory, such theory has seldom been used in a systematic fashion as a basis for foreign language test construction.

**CONCLUSIONS:** Many suggestions have been made for construction, administration, and analysis of oral tests. Available methods for determining validity and reliability of existing paper-and-pencil tests apparently can be applied to oral fluency tests. However, the problem remains of developing economical methods for insuring administrative feasibility and comprehensiveness of the content of oral tests.

**Kaplan, Sylvan J.** *see* Reid, Jackson B.

**Kappauf, W.** *see* Payne, M. C., Jr.

**Kates, Solis L., & Klein, Louis S.** (*University of Oklahoma*) **Authoritarian beliefs and perceptual recognition of emotionally charged words.** (Sponsor, S. L. Kates)

If there are personality dispositions that render one individual receptive to antidemocratic beliefs, and other distinctly different personality dispositions that render another individual rejective of these beliefs, then it is presumed that these dispositions should be evident in their methods of organizing perceptions. One basic postulate differentiating the receptive from the rejective individual with regard to authoritarianism is their differential awareness of stimuli relating to purportedly unacceptable impulses and threatening objects. It was hypothesized that the individual who is receptive of antidemocratic ideology will require more trials than will the individual rejective of antidemocratic beliefs to recognize words associated with these impulses and objects.

**PROCEDURE AND SUBJECTS:** Ten female sophomores, six low and four high on the F scale, were shown tachistoscopically 20 words, twelve neutral (accept, America, already, caught, future, 'general, history, indeed, middle, rather, school, teacher) and eight charged words apparently associated with unacceptable impulses and threatening objects (incest, passive, pervert, Negroid, tender, dominant, immoral, feminine), all randomized. Each word was shown twice at the following speeds: .01, .02, .10, .20, .50, 1.0 sec. Subjects were instructed to identify the word, guessing if necessary, in what was ostensibly a visual acuity speed test. An analysis of variance technique was utilized.



**RESULTS:** There was a significant difference between the high and low Ss in their perceptual speed of recognition of the charged words. No significant differences were found with regard to the highs' and lows' perceptual performance on the neutral words. We can, then, conclude that the female student high in authoritarian ideology requires more trials than the low to recognize words apparently associated with some unacceptable impulses and threatening objects. For female college Ss, differences in authoritarian beliefs are paralleled by differences in speed of perceptual awareness of material related to unacceptable impulses and threatening objects.

**Katz, Aaron, & Burke, Laverne K.** (*Personnel Research Branch, The Adjutant General's Office*) **Comparison of official and experimental ratings of combat performance.**

**PROBLEM:** To compare as criterion measures efficiency reports officially rendered by officers' superiors with experimental ratings, made by officers' associates on the basis of validity, cross validity, and equivalence.

**SUBJECTS:** Ratees were West Point graduates: (1) 64 members of Classes 1945-1948, and (2) 66 members of Classes 1949-1950.

**PROCEDURE:** Two criterion measures of Korean combat performance were employed: (1) special ratings on an eight-point scale of combat performance, obtained by mail from fellow officer West Point graduates, and (2) the efficiency ratings rendered normally by superior officers. The eight predictor variables included six measures obtained while the officers were cadets at West Point, age, and precombat efficiency report scores (available for subsample 1 only). These were correlated with each criterion for each subsample separately. Each battery was cross-validated on the opposite subsample by use of correlation-of-sums formula. The criterion equivalence was estimated by three methods: correlation, corrected for attenuation, between the two criteria; correlation between the two sets of validities of the predictors; and the significance of the difference of a battery's prediction of each criterion in the opposite subsample.

**RESULTS:** In subsample 1, a multiple  $R$  of .40 was obtained for criterion 1. For criterion 2, inclusion of the precombat efficiency report among the predictors yielded a multiple  $R$  of .41 in contrast with .36 when it was excluded. In subsample 2, multiple  $R$ 's of .55 and .50 were obtained for criterion 1 and 2, respectively. The cross validities of the batteries developed in subsample 1 for criterion 1 and 2, respectively, were .46 and .43. The cross validities of the batteries developed in subsample 2 for criterion 1 and 2, respectively, were .30 and .26. The third method of

estimating criterion equivalence showed the criteria to be not different.

**Katz, Sanford** *see* Kendler, Howard H.

**Keats, John A.** (*Educational Testing Service*) **A representation of test scores and its application to a problem of error of measurement.** (Sponsor, Frederic Lord)

In his article "Variation of Standard Error of Measurement," Mollenkopf reports the finding that standard error of measurement varies with raw score. His mathematical development suffers from the necessity of making a number of assumptions, the effects of which cannot be easily examined. Criticism has been made by McNemar on this point. Mollenkopf's final formula has been objected to on two grounds:

1. It requires the computation of third and fourth moments which are unstable unless the number of cases is large. More generally, it is somewhat more complex than seems desirable.

2. The formula suggests that the standard error at a given score point will vary with the frequency distribution of scores, and so depends on the population to which the test is given rather than on properties of the test itself.

A formula is derived which does not suffer from these objections. This formula is closely related to one suggested by Lord for the standard error when sampling of items is considered. A special formula is derived for the case of equivalent items and this is generalized in two stages to the case of nonequivalent items. The data presented by Mollenkopf are re-analyzed using this formula and the results indicate satisfactory representation.

**Kelley, Harold H., & Shapiro, Martin M.** (*Yale University*) **An experiment on conformity to group norms where conformity is detrimental to group achievement.**

**PROBLEM:** To test the hypothesis that under circumstances where conformity to norms is detrimental to group success, members who feel highly accepted by their colleagues will exhibit less conformity than members who feel less accepted.

**SUBJECTS:** 75 male undergraduates worked in experimentally created three-man groups. Each S's only contact with his co-workers was through written communications which were controlled by E.

**PROCEDURE:** By introducing ratings allegedly made by their co-workers, some Ss were made to feel that they were highly accepted; other Ss, that their acceptability was in doubt. In addition, each S's actual acceptability, as judged by his co-workers, was determined. Subsequently, the groups undertook a judgmental

task on which each member could contribute to group success by determining the correct answer. During early presentations of the problem, S's two co-workers apparently agreed upon a given answer and exerted pressure on him to report it as his judgment. The S's conformity to this consensus was determined from his responses to subsequent presentations during which it became increasingly clear that his colleagues' answer was in error.

**RESULTS:** Ss who were given different information about their acceptability did not differ in the degree to which they conformed. However, a relationship was observed between conformity and actual acceptability. Among members placing relatively high value upon their group, those judged to be highly acceptable as co-workers deviated more markedly from the norm than members considered less acceptable.

**CONCLUSIONS:** Under the circumstances represented in this experiment, members who highly value their group probably experience a conflict between conforming to the norm and responding to the incompatible external cues. The evidence suggests that an individual's acceptability among his colleagues plays an important part in determining which way this conflict is resolved.

This study was supported by the Yale Communication Research Program. (Slides)

**Kelley, H. Paul.** (*Princeton University and Educational Testing Service*) **A factor analysis of memory ability.**

**PROBLEM:** The purpose of this study is to investigate the area in the memory domain concerning relatively immediate intentional retention. For memory tests limited to this area, is there a general memory factor? If not, can several distinct memory factors be identified?

**PROCEDURE:** On the basis of hypotheses regarding the nature of four memory factors, a battery of 27 memory tests was constructed. These tests, together with 13 reference tests, were administered to 442 pilot cadets at Lackland Air Force Base, San Antonio, Texas. The scores on the 40 tests were then intercorrelated and factor analyzed. The multiple-grouping method of analysis was used, with the solution being iterated twice; the resulting factor matrix was then rotated to oblique simple structure.

**RESULTS:** Eleven factors were found, three of which are rather clearly defined memory factors; these may be called rote memory, meaningful memory, and span memory. The reference tests clearly identify three other factors as verbal comprehension, numerical facility, and perceptual speed. The seventh factor is a doublet representing the specific variance of two parallel tests. The eighth factor is a triplet which cannot be positively identified. The remaining three factors

all primarily seem to involve visual tasks. These factors seem to represent visualization, spatial relations, and visual memory, but the identifications are uncertain since there seems to be confounding with deductive reasoning and psychomotor coordination.

**CONCLUSION:** It has been established that in the area of immediate intentional retention there is no general factor; three distinct factors in this domain were clearly identified, while still others were suggested. The three memory factors found seem to be differentiated in terms of process rather than in terms of content or mode of presentation.

This research was supported in part by the Office of Naval Research, United States Navy, under Contract No. N6onr-270-20 with Princeton University.

**Kendler, Howard H., D'Amato, Michael R., & Katz, Sanford.** (*New York University*) **Do intermittent reinforcements or intermittent nonreinforcements produce the greater resistance to extinction demonstrated by partially reinforced subjects?**

**PROBLEM:** In a conventional partial reinforcement conditioning procedure S receives food on some trials and no food on others. Is the greater resistance to extinction demonstrated by partially reinforced Ss due to the fact that they receive food reinforcements intermittently or is it due to the fact that they receive nonreinforcements intermittently? This is the question this experiment seeks to answer.

**SUBJECTS:** 97 rats.

**PROCEDURE:** Ss were trained to jump over a small hurdle in a straight alley under simultaneous hunger and thirst drives. Group 100 received food reinforcements on each trial. Group 50 received food reinforcements on 50% of trials and nothing on the remaining trials. Group 50-50 received food reinforcements on 50% of the trials and water reinforcements on the remaining trials. During extinction Ss in all groups were motivated solely by hunger and were run until they failed to enter the goal box in less than 15 sec. for three successive trials. The experiment consisted of two replicated studies.

**RESULTS:** The median number of responses required to reach extinction by Groups 100, 50, and 50-50 during the first study were 12, 32, and 20. The same figures for the second study were 13, 25, and 13.5. The combined probabilities of the significance of the difference between Groups 50 and 100 was .01, while the equivalent probability of the difference between Groups 50 and 50-50 was .03. The difference between Groups 100 and 50-50 was not significant.

**CONCLUSIONS:** Because Groups 50 and 50-50 had the same intermittent food reinforcement schedule, the significant difference obtained between their performance during extinction, and the lack of a significant

difference occurring between Groups 50-50 and 100, suggests that the primary reason that partial reinforcement schedules produce greater resistance to extinction is due to intermittent nonreinforced trials, rather than to intermittent reinforced trials. These results are interpreted in terms of their implications for cognitive and S-R theories. (Slides)

**Kendler, Howard H.** *see* D'Amato, May F., Mayzner, Mark S., Jr.

**Kenshalo, D. R.** *see* Nafe, J. P.

**Kessen, Marion L.** *see* Miller, Neal E.

**King, Samuel H.** *see* Haggerty, Helen R.

**Kish, George Bela.** (*College of Puget Sound*) **A demonstration of learning when the onset of illumination is used as a reinforcing stimulus.**

**PROBLEM:** Butler has recently demonstrated discrimination learning, in primates, when a response to the positive cue opened a door in a lightproof box, allowing the animal to see the laboratory environment. The present experiment attempted to demonstrate similar effects in a more simplified stimulus situation and with animals lower on the phylogenetic scale.

**SUBJECTS:** 16 female mice of the C57 Black 10 strain of the Jackson Laboratory.

**PROCEDURE:** The apparatus was a modified Skinner box consisting of a 6-in. cubic box with a fixed bar and an electronic circuit for recording bar contacts and presenting the stimulus.

After 7 days of operant level determination in total darkness, two equated groups were formed on the basis of the last 3 days of operant level responding. One group continued as before, while for the second group on the eighth day each contact with the bar was followed by the onset of dim illumination which was coterminous with bar contact. On days 9 to 12, both groups again received no stimulation. Number of responses per 25-min. daily session were recorded.

**RESULTS:** The introduction of stimulation on the eighth day resulted in a more than twofold increase in the response rate over that of the previous experimental day. The resulting difference between the control and experimental groups was highly significant.

This difference was maintained at a significant level for several of the 5 subsequent experimental days during which both groups were tested under conditions of no stimulation.

**CONCLUSIONS:** Since the observed behavior conformed to the major criteria of learning used in Skinner-box research, it was concluded that learning was manifested in the present situation as the direct result of the presentation of dim illumination as a consequence of a response.

The methodological and theoretical implications of the findings are discussed. (Slides)

**Klein, Louis S.** *see* Kates, Solis L.

**Kleinman, Milton L.** (*New Jersey State Diagnostic Center, Menlo Park*) **Psychogenic deafness and perceptual defense.**

**PROBLEM:** To investigate whether characteristic defensive reactions to anxiety-evoking verbal stimuli may be demonstrated through changes in auditory perceptual thresholds in the laboratory.

**SUBJECTS:** 22 audiology clinic patients with carefully determined psychogenic hearing loss whose thresholds for speech varied from day to day and from time to time without a discoverable organic reason were matched with 22 patients with organic hearing loss whose thresholds for speech did not vary without organic basis.

**PROCEDURE:** 14 crucial words and 14 matched unrelated neutral words, all of common usage, were each recorded on tape 10 identical times from a single master that had previously been corrected for intelligibility. This procedure was duplicated to produce 2 tapes with the identical recordings, but with the stimulus words in 2 different random orders. To make the crucial words anxiety evoking, they were present in a transcribed playlet concerned with a sharp conflict with authority. Such conflict was earlier described as one characteristic of persons with psychogenic hearing loss. After the auditory thresholds for each of the 28 stimulus words had been obtained, each S heard a transcription of the playlet. Immediately thereafter the threshold for each of the words was again obtained.

**RESULTS:** There was a significant practice effect, and this was significantly greater for the organic than for the psychogenic Ss. There was a significant difference between the psychogenic group and the organic group with respect to the difference between mean reductions in threshold for the crucial and neutral words.

**CONCLUSIONS:** These results were generally consistent with perceptual defense theory. The greater perceptual difficulty with the crucial words may represent a perceptually manifested defense against deep conflicts within the personality structure of the psychogenic subjects to which these words were related.

**Knopf, Irwin J., & Spangler, Donald.** (*The Psychopathic Hospital, State University of Iowa*) **Experimental evaluation of the Rorschach as a psychodiagnostic instrument: I. The use of summary scores.** (Sponsor, Irwin J. Knopf)

**PROBLEM:** The present study represents the first completed phase of an extensive evaluation, now under-



way, of the Rorschach as a psychodiagnostic tool, and was specifically designed to determine the extent to which Rorschach summary scores can discriminate psychiatric populations.

**SUBJECTS:** A total of 337 Rorschach protocols obtained from 131 psychoneurotics, 106 psychopaths, and 100 schizophrenics comprised the basic data for this study. The *Ss* were selected on the basis of the following criteria: (a) CA 15 years or older; (b) unanimous agreement among psychiatrists as to diagnosis both on admission and discharge; (c) diagnosis was independent of the Rorschach data; and (d) the number of Rorschach responses would not contribute to a significant difference in the mean number or the variance of responses for the three groups.

**PROCEDURE:** Each Rorschach record was rescored according to the Hertz system, and medians, means, and standard deviations were computed for each clinical group on 37 Rorschach summary scores. Chi-square tests were employed for each score separately to evaluate the significance of differences between the groups.

**RESULTS:** The *Dr%*, *H%*, *P*, Anatomy, and Sex responses were the only scores found to differentiate the groups at the .05 level or better. In order to more rigorously evaluate the stability of these findings, 50 cases from each group were selected from the larger sample of 337 by a table of random numbers. Statistical treatment of these data was the same as that used in the first analysis. The *Dr%*, *P*, Anatomy, Sex, *M*, and *Fch'* scores significantly differentiated these groups. Only the four scores which were significant on both samples were considered reliably discriminative on a group basis, while prediction in individual cases was poor. Implications of these findings and other phases of the total research project are presented in terms of the role of the Rorschach in clinical practice. (Slides)

Kogan, Nathan *see* Tagiuri, Renato

**Komisar, David D.** (*Hillyer College*) **The effects of the teaching of social science vocabulary to college freshmen on some aspects of their academic performance.**

Previous experiments on the effects of the direct study of vocabulary, as differentiated from incidental acquisition of vocabulary, indicate that, on all educational levels, students benefit from the special training. The differential effects of such techniques on students who were initially superior or inferior in preparation or ability have been left in doubt. Special techniques for teaching vocabulary, reported in the literature, are generally not readily adaptable to the usual college classroom situation.

In this study, four experimental sections containing 52 college freshmen students were compared to nine control sections, with 131 students. The experimental sections were given direct instruction in the uses of from 158 to 161 words, during 41 class sessions in a combined Social Science Area course. These words came from a list that had been prepared in advance by the entire Social Science Area teaching staff. They were studied as an integral part of the daily class work.

Before the start of the semester, all students were tested for general background in history and social studies, for scholastic ability, reading comprehension, and general vocabulary. In addition, a specially constructed test covering their knowledge of the various meanings of words found in the readings of the course was administered. At the end of the semester, this social science vocabulary test was repeated and a 100-item, objective test on the course content was also administered. Comparable forms of the reading and general vocabulary tests were also given.

Significant gains in social science vocabulary, general vocabulary, and in reading comprehension were made by those students in the experimental group who were initially in the lowest quarter on the scholastic aptitude test. These gains by the lowest quarter were not made at the expense of the learning of course content. Mean scores for the other students in the experimental group were higher than for comparable control group students, but these differences were not significant. Individual interviews with students and teachers after the semester ended indicated an acceptance of the experimental technique and a continuing use of the special methods.

**Kopstein, Felix F., & Roshal, Sol M.** (*AF Personnel and Training Research Center*) **Learning foreign vocabulary from pictures vs. words.**

**PROBLEM:** Previous research had shown that the learning of a list of paired associates is more rapid if pictures rather than words are used in the stimulus position of each pair. It was the purpose of the present study to determine whether the superiority of the pictures would obtain if (a) words in the response position were foreign rather than familiar English, and (b) testing were done with equivalent English words in the stimulus position.

**SUBJECTS:** 428 and 360 basic airmen respectively in two separate experiments.

**PROCEDURE:** A selected list of 8 nouns designating concrete objects was translated into Russian and the Cyrillic spelling approximated with an English (i.e., Latin) alphabet. Each term was also represented in pictorial form so that each Russian term in the re-

sponse position could be paired with either the pictorial form or the printed English form in the stimulus position. Two parallel versions with 9 repetitions of the list (intralist serial order randomized), and 3 test series interspersed were recorded on 16-mm. motion picture film. Test series showed only the stimulus portion of the pairs, either pictorially, or in printed form, and Ss recorded answers in written form. Two separate comparisons of the picture version with the word version were made. In the first of these the picture-trained Ss were tested with pictures, and in the second they were tested with words. In both experiments the word-trained Ss were tested with words.

**RESULTS AND CONCLUSIONS:** In the first of the two comparisons the mean number of correct pair responses on each of the three test series was significantly (1% level) greater for Ss trained with pictures. On the second comparison pictures maintained their superiority on two of the three test series, but to a lesser extent.

These results suggest that foreign vocabulary may be acquired more rapidly if pictures are used as cues, but that the advantages of such a procedure may be affected by the method of testing or application. Explanations for this are considered. (Slides)

**Korchin, Sheldon J., & Basowitz, Harold.** (*Institute for Psychosomatic and Psychiatric Research and Training, Michael Reese Hospital*) **The tachistoscopic Bender-Gestalt test.**

Ordinarily, the stimuli of the Bender-Gestalt test are in full view of the subject during the period of reproduction. In the present studies, the stimuli are presented tachistoscopically at three exposure levels. Since previous research has shown that form perception is disturbed by induced as well as clinical anxiety, it is expected that the accuracy of perception, under the restricting conditions of tachistoscopic exposure, may provide a measure of control or "ego strength." The present paper describes the rationale for this procedure, a method of scoring, reliability of scoring, and some relationships with other psychological measures.

The procedure was administered to 20 persons, 55 to 65 years of age, and to 14 Ss between 25 and 35 in the course of a study of aging, and to 86 army men as part of a study of reactions to stress in paratrooper training. The entire set of stimuli was presented at each of the three exposure levels; S reproduced each stimulus in turn.

All reproductions were scored by the method proposed by Pascal and Suttell. Some of the problems involved in this scoring scheme are discussed. High

intrarater and interrater reliability was found, although the extent varied with item and exposure level.

In one study it was found that the younger Ss scored distinctly better than the older sample. Within the older group there was a significant relationship between performance at the fastest exposure level and over-all adjustment, as measured by the Fisher Maladjustment Index of the Rorschach test. This relationship decreased at the longer exposure levels. Results of the study of army men indicate that performance on the Bender is related to adequacy of functioning under stress, as measured by various psychological, physiological, and performance indices.

In general, the Bender-Gestalt test, administered tachistoscopically, seems to be a promising technique in psychodiagnosis. Perceptual efficiency, particularly at faster exposures, may provide a measure of personality adequacy. (Slides)

**Kounin, Jacob S., & Polansky, Norman A.** (*Wayne University and Austin Riggs Center*) **Commitment to a potentially helpful person after an initial contact: a field study.**

**PROBLEM:** The purpose of this research is to study the process by which the relationship of a client and a professional helping person is established. The focus is on those experiences a client has in his first interview with a counselor or other therapist which influence his commitment to the interviewer in his professional role. Commitment is defined as the client's (a) willingness to see the counselor again, and (b) willingness to be influenced by the relationship.

**SUBJECTS:** 150 clients sampled from university counseling centers, family casework agencies, and a medical clinic.

**PROCEDURE:** Clients were interviewed after their first session with a professional helper by members of the research staff. Clients' reactions to open-ended questions were coded for their (a) perceptions of the interviewer's actions and techniques, (b) conceptions of the interviewer's more enduring traits and motivations, and (c) satisfactions and dissatisfactions experienced (tension changes) during the interview. In addition, their responses to structured multiple-choice items were scored for their judgments and experiences along 12 dimensions of the interview.

**RESULTS:** Correlations were obtained for three kinds of data pertaining to clients' (a) judgments about 12 aspects of the interviewer and the interview, (b) experienced tension changes, and (c) two kinds of commitments. Tension changes were categorized as problem-centered or as relationship-centered. Some judgments correlated with problem-centered tension changes only; others with relationship-centered tension changes only; and still others correlated with

both. The two commitments were not correlated with each other but were correlated with different dimensions of experiences during, and with judgments about, the first interview.

**CONCLUSIONS:** A client's experienced tension changes during an initial interview affect his perceptions of an interviewer and an interview along measurable dimensions. The dimension affected is a function of the kind and degree of experienced tension change. These perceptions, in turn, differentially influence the kind of commitment a client is willing to make to a professional helper.

**Kovnar, Murray R.** (*Personnel Policies Division, Directorate of Personnel Planning, Deputy Chief of Staff, Personnel Headquarters ATRC*) **A statistical evaluation of the USAFI GED Tests as instruments for counseling air force personnel.**

This study was designed primarily to aid in the re-evaluation of the high school level GED tests. First, it was intended to investigate the discriminating validity of the GED tests. Secondly, to compare the GED test scores with those obtained in Air Force Classification Battery (ACB), Armed Forces Qualification Tests (AFQT), and in the commonly used college aptitude tests, such as the American Council on Education Psychological Examination (ACE) and Diagnostic Reading Tests (DRT).

It is possible to draw the following conclusions from the results obtained:

1. The correlation of GED battery total scores with ACB 5 (Tech. Specialty) was .66, the multiple correlation with AFQT was .69 and after adding ACB 2 (Clerical) was .694. From this it may be concluded that certain of the tests in the correct combinations seemed to have value in their ability to predict GED battery total scores.

2. The DRT test correlated most highly with the total GED test scores as well as in the five subgroups.

3. The GED tests and the AFQT apparently measure similar factors among those appearing in tests of intellectual ability.

4. The GED tests and the ACE tests appear to measure the factors common to scholastic aptitude.

5. The GED tests do not appear to be affected by number of years of schooling completed.

6. The GED tests require approximately ten hours of testing time and do not appear to add any significant information for counseling purposes inasmuch as the AFQT and ACB are already available for each airman. ACE and DRT require only one hour each to administer.

7. The intercorrelations of GED tests 2, 3, and 4 with the GED total for all five tests is .84. It appears

that one of these tests would predict as effectively and require less testing time.

**Krasner, Leonard.** (*VA Hospital, Lexington, Kentucky*) **An orientation for research in psychotherapy.**

It is suggested that future research in psychotherapy involve systematic programs oriented toward determining relationships between basic variables of the therapeutic situation. It is hypothesized that the common factor in all therapeutic situations can be found in lawful relationships between certain aspects of the behavior of the therapist, seen as independent variables, and certain aspects of the behavior of the patient, seen as dependent variables.

Any systematic behavioral analysis of the therapeutic relationship, in fact of any interpersonal relationship, must start with the fact that the therapist's behavior consists of certain cues indicating that he is paying attention to the patient's behavior and verbalizations. These cues may include his physical presence, nodding his head, smiling, writing, saying "mm hmm," or overt verbalizations. Behavior cues indicating attention on the part of the therapist are generalized reinforcers in that they serve to increase the probability of occurrence of the behavior of the patient to which they are applied. The therapist selects certain classes of the patient's verbal behavior to reinforce; the specific class, e.g., feeling tone words, family descriptions, sex history, will depend on the therapist's theoretical orientation. Changes in the patient's verbal behavior are then, in part, a direct function of having been reinforced by these behavior cues. Is this relationship between therapist's behavior and changes in patient's verbalizations equally lawful for all categories of patients, for all therapists? Does it hold for all stages of therapy? Is there a hierarchy of behavioral cues in their degree of effectiveness? Even more important than answering specific problems is the fact that this type of orientation to psychotherapy research gives a means of systematically handling the process of psychotherapy in its most basic form.

**Kriedt, Philip H., & Gadel, Marguerite S.** (*Prudential Insurance Company of America*) **Use of the Kuder Preference Record in selecting clerical employees.**

To provide information regarding the usefulness of the Kuder Preference Record in selecting clerical employees, the Kuder was administered to 973 newly hired women in 1948. These employees were placed on typing and general clerical assignments.

Relationships of each of the nine Kuder keys to turnover and advancement in the company were com-



puted five years later in 1953. The principal findings are these:

1. The clerical employees who remained with the company for at least five years had fairly high scores on the computational and social service keys. Other scores were about average for Kuder norms set on high school students.

2. The clerical, computational, and artistic keys were significantly related to turnover. The women who remained with the company scored higher on the clerical and computational keys and lower on the artistic key than those who left.

3. The scientific and clerical keys were significantly related to advancement. Women who had received the most promotions had higher scores on the scientific key and lower scores on the clerical key than the rest of the group. These results were not expected.

While these results have interesting implications regarding factors involved in the job satisfaction and success of clerical employees, the findings add little to the effectiveness with which we can select clerical employees who will stay with the company and perform their jobs well. Other predictor measures such as company-developed aptitude tests and biographical data blanks have higher validity than the Kuder for this purpose.

**Kris, Christine.** (*Illinois Institute of Technology and University of Chicago*) **Demonstration of the cyclical technique for the psychophysiological study of the individual case.** (Sponsor, P. S. Shurrager)

In studies dealing with the quantitative relations between physiological states and performance over time, the problem of locating optimal periods for testing arises. If variations in work output can be related to known metabolic cycles—such as diurnal fluctuations in body temperature—the prediction of a person's curve becomes possible in terms of expected changes in quantity and variability of output. These can be calculated from the beginning of an iterative series to later portions of it. In this vein, a time-series analysis of diurnal variations in body temperature and heart rate (reflecting relative metabolic state) and in a measure of sensory-motor work output (Philpott's "dotting-in-squares test") was undertaken upon data gathered on a female *S*, hospitalized as a normal control for hormone studies, and on constant diet and sleeping hours for three months. IBM were used in the analysis. Significant auto- and cross-correlations were obtained. In addition, a two-way analysis of variance showed the following: the within-day variation is five times greater than the day-to-day variation in all three measures, although

both intra- and interday variations are significant at the .01 level. A control study using 14 *Ss* over a portion of a day supports the results.

**IMPLICATIONS:** (a) Instead of employing the methods of "constant intervals" or "random sampling," the variability of portions of the day cycle can be estimated, and times of least variation selected for testing. (b) If behavior variations (e.g., activity level) are functionally adapted to the alternating day-night and sleeping-waking periods, such that the "normal" range of variation within and between variables can be ascertained, then individuals are characterized by their typical wave forms, for which a personal equation can be written. (c) Whereas wave forms averaged over time tend to be "unique" for individuals, specific patterns of superposition of the cycles may be "general" to distinct types of people in the population. (Manic-depressive alternations in both physiological state and overt behavior are examples of longer cycles.) Hence a synthesis may be achieved between the "nomothetic" and the "ideographic" approach to the measurement of changing psychophysiological patterns underlying "personality." (d) The effects of different hormones on changes in the diurnal and menstrual cycles are discussed. (Slides)

**Kubzansky, Philip E.** (*Duke University*) **Anxiety, stress, and flicker fusion measurements.**

**PROBLEM:** Do high-anxiety (HA) normals have lower and more variable flicker thresholds than low-anxiety (LA) normals? Will stress affect flicker measures differentially in HA and LA groups?

**PROCEDURE:** Extreme scores on the Taylor anxiety scale were used to select 45 HA and 43 LA *Ss*. The flicker equipment was an electronic apparatus which provided a 20–60 cps range, each exposure lasting 1.5 sec. Subjects were administered 10 runs by a method of limits procedure utilizing a half-cycle step interval. After a 20-min. break during which *Ss* were uniformly occupied, each anxiety group was subdivided into three subgroups, and the following conditions were introduced: a Neutral condition; a Task Stress condition in which the exposure time was markedly reduced; a Failure Stress condition in which *Ss* were told they had done very poorly. Subjects then received two trials of 15 runs each, separated by a 30-sec. rest. A poststress interview was held to evaluate *Ss*' reactions to the treatments.

Flicker fusion data were plotted on normal probability paper which yielded two measures: threshold (sensitivity) and slope (variability). The results were evaluated by analysis of variance techniques. **RESULTS:** There were no differences between anxiety groups on threshold or decline in threshold over trials.

There were no effects in the flicker measures attributable to stress. There were differences between anxiety groups in slope scores ( $p = .001$ ) and in the extent to which these scores dispersed around their respective group means ( $p = .01$ ).

Subjective reactions to stress differed in anxiety groups. High-anxiety Ss localized failure and difficulty within themselves; low-anxiety Ss denied difficulty or failure as their own responsibility.

The findings are discussed for their relevance to anxiety, stress, and flicker fusion methodology.

**Kundrat, John, & McGuire, Carson.** (*University of Texas*) **Mediation processes in perception and recall.**

The experiment was designed to test propositions about a mediation process between perception of a stimulus and a behavioral response. Stimuli ( $S_E$ ) were four sets of human pictures representing affection, aggression, homosexual, and neutral themes. Four orders of presentation ensured variation in affect state ( $S_D$ ). Potential discrepancies in cognitive structure ( $S_{cog}$ ) and set toward the themes had an operational counterpart in the sample populations.

The Ss were 40 Negro and 40 Anglo college students, each sample population having 20 males and 20 females, equated for age and life style. Following practice, pictures were shown tachistoscopically to each S to obtain two kinds of recognition scores. One was a value for the level of illumination, or voltage recognition threshold (VRT). The other was speed of recognition (SRT), the two experimental conditions being counterbalanced. Then, with the removal of perceptual constraint, Ss were asked to recall pictures (NPR).

Analysis of variance for transformed values showed that deviations between persons significantly exceeded deviations within for VRT and SRT under conditions of perceptual restraint, but not for NPW, a mnemonic situation. Order of presentation ( $S_D$ ) was a significant main effect in both VRT and SRT values. Speed of perceptual response (SRT) was equally low for affection and aggression themes and much higher for homosexual. The illumination mode (VRT) was the only one influenced by a variation in cognitive structure ( $S_{cog}$ ). Negro Ss had lower VRT's for neutral and higher for homosexual themes than Anglo Ss. Both Negro and white Ss recalled significantly more homosexual and fewer neutral pictures.

The experiment shows that mediation processes under perceptual constraint vary significantly from those in a mnemonic situation. Negro and Anglo Ss of the same age, sex, and life style respond to affect-laden pictures in a similar manner with the one exception in the illumination condition. (Slides)

**Kurtz, Kenneth H.** (*Yale University*) **Transfer of discrimination training with complex stimuli.** (Sponsor, Carl I. Hovland)

This study investigated transfer of discrimination training between two successive discrimination problems employing identical or similar pairs of discriminanda. The hypothesis tested was as follows: if the discriminanda are distinguished by the same property in both problems, positive transfer will be obtained in the second; if the discriminanda are distinguished by different properties, negative transfer will be obtained.

The second, or test, problem consisted of paired-associates learning employing eight complex visual figures as stimulus items and eight color names as response items. The eight stimulus items consisted of four pairs of figures such that the two figures of a given pair were highly similar to one another and highly distinct from the figures of all other pairs. These four pairs of stimulus items were subjected to four different conditions of prior discrimination training as follows: (a) no training (control); (b) training with the same two figures employed on the paired-associates test; (c) training with two figures that were similar (not identical) to the test pair and distinguished by the same property; and (d) training with two figures that were similar to the test pair but distinguished by a different property. The prior discrimination training consisted of a series of trials in which Ss (40 Yale students) were shown first one figure, then the same figure again or the remaining one belonging to the same pair, and required to specify whether the two were the same or different.

The results obtained supported the hypothesis stated at the outset: positive transfer, indicated by a smaller proportion of intrusion errors and fewer trials to mastery, was obtained under conditions b and c as compared with condition a; negative transfer was obtained under condition d as compared with condition a. No differences were obtained between conditions b and c. (Slides)

**Kutner, Bernard, Fanshel, David, & Langner, Thomas S.** (*Department of Public Health and Preventive Medicine, Cornell University Medical College*) **Some social and psychological correlates of health in old age.**

**PROBLEM:** Although much is available concerning the prevalence and nature of illness in old age, less is known of the social and psychological concomitants of poor health. It was predicated that poor health would be related to advanced age, low social and economic position, low income, lack of preventive health examinations, lack of health insurance, unemploy-

ment, unrealistic health self-appraisal, and anxiety over health status.

**SUBJECTS:** 500 residents of the Kips Bay-Yorkville district of New York City between 60 and 90 years of age.

**PROCEDURE:** An interviewer-administered questionnaire was employed as part of a survey of problems and needs of older people. A Physical Health Index was developed weighting the following: (a) amount of time spent in bed during the past year due to illness, (b) social and economic deprivations due to health, (c) number of illnesses, and (d) certain "critical" diseases.

**RESULTS:** (a) The proportion in poor health remains constant throughout each level of the age span. (b) Health status systematically declines with decreasing socioeconomic status. (c) The lower the weekly income, the poorer the health condition. (d) Preventive health examinations are unrelated to good health, but (e) possession of prepaid health insurance is predictive of improved health. (f) The retired and housewives are intermediary in health status to those employed and unemployed. (g) Health status self-appraisal was found to be accurate at all health levels. (h) Health anxiety was only moderately related to poor health.

**CONCLUSIONS:** The results indicate that health problems have relatively low salience among the aged, some segments of which take pains to avoid or ignore their symptoms. Stoicism over health is more characteristic of those in the upper economic group as well as those of West European or native birth. Many old people seem resigned to accept illness as a "natural" consequence of old age, and are consequently unmotivated toward health maintenance.

**Lane, Robert C., & Singer, Jerome L.** (*New York University and Franklin D. Roosevelt VA Hospital, Montrose, New York*) **Parental attitudes of schizophrenics and normals of different socioeconomic levels.**

**PROBLEM:** This study, using more objective methods, continues a program investigating social class influences on familial attitudes. Specific hypotheses concerning differences in attitudes toward parents of schizophrenics and normals were derived from relevant psychological and sociological studies of family constellations.

**SUBJECTS:** Four groups with 24 male Ss in each were employed: middle-class normals, middle-class schizophrenics, lower-class normals, lower-class schizophrenics. Groups were equated for age, religion, duration of illness, childhood residence in home, etc. Normals were VA medical patients screened for

neuropsychiatric history; schizophrenics were clearly diagnosed paranoids. Socioeconomic classification employed as criteria education, occupation, fathers' occupation, income, dwelling, and neighborhood.

**PROCEDURE:** The Elias Family Opinion Survey and a specially devised Family-Attitude Scale were employed. The FAS involved scenes depicting family situations accompanied by series of statements which Ss sorted on intensity scales. Extensive prior judges' ratings had established response categories relevant to hypotheses. Suitable reliabilities were obtained for all scales. An additional 60 TAT protocols of schizophrenics were studied qualitatively. Data for EFOS and FAS were evaluated by analyses of variance for sources: socioeconomic status, personality (schizophrenics-normals), and interaction.

**RESULTS:** Schizophrenics differed from normals in revealing greater evidence of rejection, interparental conflict, dependence, and maternal control by stress on duty and obligation. Social class differences also emerged, lower-class Ss revealing greater paternal rejection, greater maternal idealization, greater denial of hostility, and greater maternal overprotection. Most striking were the interactions, middle-class normals and schizophrenics differing more markedly than did lower-class groups. Middle-class schizophrenics showed more hostility toward mother figures, while lower-class schizophrenics tended to idealize mothers and deny hostility. Results emphasize the importance of maternal attitudes in schizophrenia but also suggest differential influences of family constellations at different socioeconomic levels.

**Langner, Thomas S.** *see* Kutner, Bernard

**Lauer, A. R.** (*Iowa State College*) **Comparison of group paper-and-pencil tests with certain psychophysical tests for measuring driving aptitude of Army personnel.**

The study is based in part on a contract research carried out under the auspices of Department of Army, Personnel Research Branch, TAGO. Three populations of Army drivers comprising samplings of 203, 124, and 331, respectively, were used in the study. All drivers were currently driving Army vehicles and had known experience records. They were used to validate and cross-validate a battery of paper-and-pencil predictors selected and developed for this purpose.

In a three-phase validation program 12 tests were found to yield satisfactory validity coefficients to warrant their use in computing a multiple *R*. Various combinations of subtests were explored and seven were found to give a validity of .38 when assembled into a workable battery of approximately 60 minutes



administration time. The Army Ratings for Drivers, PRT 2408, was used as the criterion.

Comparisons were made with the individually administered psychophysical battery used by the Army and known as PRT 565. The hypothesis that a properly validated group paper-and-pencil battery of tests would predict driving ability better than individually administered tests in common use was confirmed. The battery of group paper-and-pencil tests was found to measure at least twice the variance as that measured by the individual test battery of psychophysicals. (Slides)

**Lauer, D. W., & Estes, W. K.** (*Indiana University*) **Observed and predicted terminal distributions of response probability under two conditions of random reinforcement.**

A mathematical model which has been found to describe human learning in simple, two-key discrimination problems will here be applied to the learning of a T-maze problem by rats. With the assumption that under a correction procedure the stimulus sample occurring on each trial becomes conditioned to the response that terminates the trial, the model yields several predictions. Two will be tested: (a) At the asymptote of learning, probability of a response should vary around a mean value equal to its probability of reinforcement, regardless of whether reinforcement is randomized with respect to trials or blocks of trials. (b) Rate of learning should vary directly with number of trials per block.

Group I, 16 rats, was given one daily trial and Group II, 17 rats, four daily trials in an enclosed T unit with correction procedure and food reinforcement. After a preliminary series of four reversals of the left-right discrimination with 100% reinforcement, followed by 28 days of 50% reinforcement, both groups were given 56 days of 75% reinforcement. For Group I, reinforcement was randomized with respect to trials, for Group II, with respect to daily blocks.

Data were analyzed in terms of responses on first trials of daily blocks. Initial rates of learning were greater, but insignificantly so, for Group II. By the end of the 75% series, both groups had reached apparently stable terminal levels. Over the last 16 days, the daily proportions of responses toward the 75% side were distributed around mean values of .75 and .71 for Groups I and II, respectively, with variances which approximated the predicted values.

These findings, together with those of other recent studies, indicate that under appropriately simplified conditions, asymptotic behaviors of human and animal Ss in two-choice situations are described by the same theoretical model. (Slides)

**Lazar, Irving.** (*University of Illinois*) **Student-faculty similarities in the choice of social values.**

**PROBLEM:** Do the social values of college students become more homogeneous and more similar to the faculty's values as they progress through school? Do successful students more closely agree with the faculty's values than do unsuccessful students?

**SUBJECTS:** 224 students and 38 teachers comprising 99% of the population of a small college, 30 undergraduates at a large university, and 50 randomly selected people.

**METHOD:** Ss ranked 39 social and educational value statements derived from an open-end questionnaire administered earlier. Median retest reliability of the ranking instrument was .74. The students were grouped in terms of class in school and subsequent graduation from college. Coefficients of concordance within these subgroups were compared for studies of intragroup homogeneity. Product-moment correlations between arrays of mean ranks were computed for studies of intergroup agreement.

**RESULTS:** (a) Faculty were more homogeneous than students. (b) Students in different institutions were equally homogeneous, while the random group was significantly heterogeneous. (c) Homogeneity decreased significantly with years in school. (d) Seniors agreed more closely with the faculty ( $r = .822$ ) than did the freshmen ( $r = .525$ ). (e) The correlation between subsequent graduates and the faculty was .909, while the correlation of subsequent dropouts and the faculty was .722. Freshmen who later graduated correlated .725 with the faculty, whereas freshmen who later left school correlated .504 with the faculty's mean ranks. Both differences are significant.

**CONCLUSIONS:** These findings, part of a larger study by the author, suggest that a group's values change to conform to those required by a collegiate situation. Individuals who do not adapt to these tend to leave the group. Implications for the effects of collegiate procedures on students are discussed.

**Lee, Francis J., Horwitz, Murray, & Goldman, Morton.** (*Bureau of Educational Research, University of Illinois*) **Power over decision making and the response to frustration in group members.** (Sponsor, Murray Horwitz)

**PROBLEM:** Members of social groups commonly develop expectations concerning their own power, relative to others' power, over decisions that require member action. We assume that, holding frustration constant, hostility is a direct function of the degree to which S perceives the frustrating act as reducing his expected own power. The hypothesis tested is: Given the same frustrating action required of members,

hostility toward an agent who forces the group into this action will vary directly with the perceived magnitude of reduction of members' expected power over the decision to act.

**SUBJECTS:** 30 groups, each comprising four to six ROTC students.

**PROCEDURE:** Ss were informed that the study aimed at evaluating different teaching procedures. Groups met with one of two instructors in one of three experimental treatments. During a session, Ss periodically voted whether or not the teacher should repeat his instructions of the material being taught. The influence of Ss' votes over the decision was assigned a certain weight relative to the teacher's vote and to institutional considerations. The pace of instruction was rapid to induce Ss to desire repetition; the group vote was always announced as favoring repetition. All groups were equally frustrated, however, in that instructors always continued without repetition. Although activity outcomes were identical, the three experimental treatments were devised so that instructors appeared to differentially reduce power of members over decision making. Pre- and postmeasures on hostility toward instructors were administered.

**RESULTS:** The hypothesized relationship between hostility and magnitude of reduction of expected power over decision making was confirmed. Results will be discussed in terms of effects of variables related to own power on whether or not frustration will operate as an instigation toward aggression.

This research was performed under contract with the Office of Naval Research. (Slides)

**Lehman, Harvey C. (Ohio University) Gainful occupations engaged in most often by men and women of age 65 and over.**

Within recent years there has been a growing tendency to exclude a larger and larger percentage of older people from participation in the labor market. As things now stand any further increase in man's longevity will add primarily not to his working-life expectancy but to his years in retirement.

With the gradual institutionalization of 65 as the retirement age, and with widespread discrimination against men over age 45, what are the present-day prospects of employment for older men and women? From the U. S. census reports for 1890, 1900, 1920, 1930, 1940, and 1950, the writer obtained (separately for men and for women) all of the occupations listed that included much more than their proportionate shares of workers of age 65 and over. The procedure by which this nationwide survey was made may be illustrated as follows:

In 1950 male workers in the U.S.A. of age 65 and over comprised 5.4% of the total labor force. If these

oldsters had been equally distributed among the various occupations, men of age 65 and over would have comprised exactly 5.4% of each occupational group. But, due to a wide range of factors, no such distribution was found. Some occupations included far less and others far more than their proportionate share of oldsters.

For the six census reports mentioned above, this study reveals: (a) the specific occupations from which older workers have been least frequently crowded out by younger ones, (b) the consistency with which this has occurred during the last 60 years, and (c) some of the changes in labor force participation on the part of oldsters that have been occurring in our rapidly changing civilization.

**Lehrer, Ruth, & Shushereba, John. (Woodside Receiving Hospital, Youngstown, Ohio) A dynamic approach to the diagnosis of homosexuality in patients with acute symptomatology. (Sponsor, Ruth Lehrer)**

The case history method can be used to develop immediately useful categories for the dynamic classification of active or covert homosexuality in patients observed in a psychiatric clinic and hospital. We have found that homosexuality in these patients is best considered within three contexts: the immediate circumstances under which the patient comes to us, the family and social circumstances in which the problem developed, and the degree to which the homosexual problem is discerned as a character (and therefore behavior) involvement, or as unconscious (projected) or conscious impulse leading to acute neurotic or psychotic symptomatology. In this paper we have formulated several category descriptions, each illustrated by a case history, and given our experiences or impressions as to psychotherapeutic treatment. The category descriptions follow.

**CATEGORY A:** Homosexuality as consciously perceived or unconscious (projected) impulse in acute or pre-psychotic symptomatology.

**Subcategory 1.** The person is in acute panic after a real or projected homosexual approach is made to him. The reaction mobilizes within a brief period of time, or cumulates until a breakdown reaction occurs.

**Subcategory 2.** The person fails in a heterosexual situation, which leads to self-questioning, then a panic reaction.

**CATEGORY B:** Homosexuality as character disturbance.

**Subcategory 1.** The person is actively homosexual, with some symptom expression (for example, phobic fears) which underscores the neurotic nature of the total character involvement.

**Subcategory 2.** The person is actively homosexual,

with no neurotic anxiety mobilized; basic character development is probably schizoid psychopathic.

**CATEGORY C:** Latent and active homosexuality in early adolescence as a disturbance in psychosexual development.

Subcategory 1. The adolescent is sexually preoccupied with his relationships to his own sex age group or older persons.

Subcategory 2. The adolescent is actively homosexual after seduction by an older person. Overt homosexuality is superimposed upon a background of psychosexual immaturity, and intensified sexual desires which have not found reliable approved outlets.

**Leibowitz, H., Woolsey, C. N., & Lende, R. A.** (*Departments of Psychology and Neurophysiology, University of Wisconsin*) **Comparison of evoked potentials from visual I and visual II of the cerebral cortex of the rabbit.**

Studies of the cerebral localization pattern by the evoked potential technique have shown that vision, as well as audition and touch, are doubly represented in each hemisphere. These dual areas in vision have been designated visual I and visual II, and in the rabbit are located on the dorsolateral surface of the hemisphere as mirror images of each other. As a test of the hypothesis that this dual cortical localization is analogous to the duplicity at the retinal level, evoked potentials from visual I and II were compared under experimental conditions designed to exaggerate the functional differences between the scotopic and photopic visual systems.

In order to determine the location of the visual areas on the smooth brain of the rabbit, the cortical strip responsive to gross ipsilateral stimulation was mapped in animals under deep Pentobarbital sodium anesthesia. By reference to the detailed map of Thompson, Woolsey, and Talbot, the line of decussation marking the common boundary of visual I and II is taken as the bisector of this ipsilateral response area. "Corresponding" points in visual I and II were chosen equidistant from this line of decussation, and the minimum luminance required to evoke activity in pairs of these points was determined. Since no differences were found at threshold, luminance was increased to suprathreshold values using both "blue" and "white" light and stimulating both ipsilaterally and contralaterally. No obvious differences between the evoked potentials from visual I and II were obtained under any of these conditions. Both regions respond with the same amplitude, form, and latency. Possible reasons for the failure to produce a differential response are the underdevelopment of the photopic system in rabbits or the lack of a functional difference between visual I and II.

**Lende, R. A.** *see* Leibowitz, H.

**Lennard, Henry L., & Glock, Charles Y.** (*Bureau of Applied Social Research, Columbia University*) **The role of psychological factors in hypertension: the status of current research and implications for future research within an interdisciplinary framework.** (Sponsor, Herbert Krugman)

**NOTE:** The Division of Epidemiology, School of Public Health, and the Bureau of Applied Social Research, both of Columbia University, have for the past two years been collaborating in the design of a multidisciplinary long-term study of the natural history of hypertension. The present paper represents a summary of a larger report.

Generally, the paper represents a synthesis and systematization of current theory and research on psychological factors in hypertension, and a clarification of methodological problems engendered in testing current hypotheses in a long-term study. The paper is organized into three sections. The first attempts to delineate the conceptual models current in psychosomatic research today. Psychological research on hypertension is then examined in terms of the model within which it operates. The basic difference between models lies in the nature of the variable interrelationships postulated. Five models have been identified and labeled. The second section briefly lists some of the major hypotheses emerging from current clinical, experimental, and therapeutic work on the role of psychological factors in hypertension. The hypotheses are ordered in terms of focus (type of conflict, nature of stress, perceptual factors, etc.). The third section reviews the projected program of research on the natural history of hypertension, and discusses the methodological problems raised by the testing of specific psychological hypotheses within such an interdisciplinary framework.

**Levin, B. Martin.** (*University of North Carolina*) **A critical evaluation of intensity analysis.** (Sponsor, Wilfred A. Gibson)

Guttman has recently presented a technique, called intensity analysis, designed to locate a rational origin along an attitude continuum. The attitude continuum is defined by Guttman's technique of scale analysis, and intensity is determined by either one of two procedures, called the fold-over technique and the added-question technique.

Guttman has claimed that intensity analysis gives a zero point that is independent of the items used in the questionnaire, provided that the items are from the same scalable universe. This claim was based on the assumption that intensity can be scaled using scale analysis.



In this study it was shown that neither added-question nor fold-over intensity can be scaled. It was also shown analytically that a biased set of items can bias the location of the computed zero point.

Two previous empirical studies seemed to substantiate the claim that intensity analysis gives a zero point that is independent of the items used. The criterion of bias in those studies was based upon the dichotomized form of the items that resulted from scaling. It was felt that for the purpose of testing this claim, a more appropriate definition of bias would be one based upon the location, along the content continuum, of the subjects who feel least intense about the attitude statement. Therefore, a new empirical study, similar to the previous ones, except for the different definition of bias, was undertaken. This study substantiated the hypothesis that the bias of the items can affect the location of the computed zero point. The results were significant at the .01 level for the fold-over technique and the .001 level for the added-question technique.

It was concluded that intensity analysis does not give a zero point that is independent of the items used. (Slides)

**Levine, Murray.** (*University of Pennsylvania and VA Mental Hygiene Clinic, Philadelphia*) **The judgment process in the rating of personality characteristics of others.** (Sponsor, Julius Wishner)

Hypotheses deduced from Helson's adaptation-level theory of judgment were tested in relation to judgments of personality characteristics. Hypothesis I dealt with a function of the self as an anchor in the judgment series, where the self, as measured by mean ratings by peers, was assumed to be a heavily weighted stimulus object. Hypothesis II stated that a famous personality would function as an anchor when introduced into a series of stimulus objects consisting of peers of the rater. Hypothesis III predicted an "interaction" between the self and the anchor personality in relation to ratings of the characteristics of the raters' peers.

Twenty-four high school club members and 20 members of each of three college sororities judged each other and themselves twice on each of three characteristics: warm, good-looking, sociable. Ratings were made on a 10-point graphic scale. The first judgments were made without anchors; the second series included anchors for the good-looking and sociable characteristics. Warm was simply rerated, the reratings serving as a control for sheer repetition.

The self, as defined, functioned as an anchor in relation to judgments of good-looking only. The girls rated as good-looking rated others more "unattrac-

tive" than did the girls rated unattractive. Anchors, where used, resulted in highly significant shifts in mean ratings of others, as predicted. The nature of the interaction for good-looking characteristic was as predicted, but it was not quite significant. The interaction for the sociable trait was significant, but its interpretation required qualification. Other factors, which seem to affect the judgment process, but which are not treated by adaptation-level theory in this area, are discussed. Some of these include the nature of the trait which is judged and the characteristics of the group in which the judgments are made. (Slides)

**Levinson, Daniel J., & Gilbert, Doris C.** (*Harvard University and Boston Psychopathic Hospital*) **Studies in ideology: I. "Custodial" mental illness ideology and its relation to personality.**

This study is concerned with "custodialism" and "humanism" in the mental hospital. These terms refer to two contrasting types of hospital structure, and to the ideologies by which they are rationalized. Custodial and humanistic ideologies differ on the key issues of hospital life, e.g., the definition and interrelations of the various roles, the nature and causes of mental illness, and the preferred forms of treatment. Custodial orientations are relatively autocratic in their view of hospital structure, and relatively prejudiced, hereditarian, and "somatic" in their approach to patients. Humanistic orientations are more democratic, unprejudiced, and patient-centered.

The Custodial Mental Illness Ideology (CMI) Scale was developed on the basis of an extensive analysis of these contrasting orientations. Its functions were: (a) to test the hypothesis that numerous, seemingly disparate ideas "go together" to form a relatively coherent orientation in the individual; (b) to provide an index of an individual's position on the custodialism-humanism continuum; (c) to be used in determining various sociopsychological correlates of custodialism.

The CMI scale was administered to personnel, patient, and relative groups ( $N = 575$ ) at one English and three American hospitals whose structures differ considerably in degree of custodialism. Its reliability is .8 to .9, and it has adequate internal consistency; thus, it fulfills functions a and b above.

We hypothesized that custodialism and humanism have differential psychological bases in the personalities of their adherents. CMI correlates .6-.8 with the F (authoritarian personality) scale, in the various groupings studied. There is a significant relation between type of hospital or role structure, mean CMI score, and mean F score for the various hospital and role groupings. There is also considerable variability

of CMI and F scores within most groupings. The theoretical bases and implications of these relationships will be discussed. (Project supported by National Institute of Mental Health)

Levinson, Daniel J. *see* Gilbert, Doris C.

Levitt, Eugene E., & McCandless, Boyd R. (*Child Welfare Research Station, State University of Iowa*) **Some interrelationships among tests pertaining to the authoritarian personality syndrome in children.**

This study investigates interrelationships among three tests of race prejudice (particularly anti-Negro) and three measures of "authoritarian tendency" in children. The latter 3 tests were found to be significantly interrelated in an earlier study. The 3 tests of prejudice were the Horowitz Faces Test (HFT) and the Minnesota Attitude Scale (MAS), which are tests of anti-Negro tendency, and the California Attitude Inventory (CAI), a 50-item scale of general race prejudice. The Children's Anti-democratic Tendency Scale (CADS), the Problem Situations Test (PST), a measure of punitiveness in the child, and an incomplete sentences blank (ISB) used to measure parental punitiveness were the authoritarian tendency tests. The Ss were 154 fourth- and fifth-grade children, and a second group of 89 fifth graders. Sex ratios were approximately equal.

The HFT and MAS were administered to the larger group. All tests except MAS were administered to the smaller group. Distributions approached normality except for MAS, which was badly skewed in the nonprejudice direction. No sex differences appeared except in variability on the CAI and the sociometric section of HFT, the girls being more variable. In the larger group, it was found that the upper and lower 10% on the MAS differed significantly on both parts of the HFT. However, in the other group, all correlation coefficients (computed separately for each sex) were insignificant including those between the Negro subscale of CAI and both parts of HFT. The range of 28 coefficients was  $-.13$  to  $+.18$ . The upper and lower 10% on the Negro subscale of CAI differed significantly on the HFT even though the correlations were insignificant.

The PST and CADS were significantly related to IQ for both sexes. The CAI was related to IQ for boys only. IQ relationship for the MAS was not available. No other measure was significantly correlated with IQ.

Implications of these complex interrelationships are discussed.

Levy, R. H. *see* Shurrager, P. S.

Levy, Seymour. (*Student Counseling Bureau, University of Minnesota*) **The relationship between participation, membership motive, and feelings of stress in groups varying in cohesiveness.**

PROBLEM: What is the relation in groups varying in cohesiveness between amount of participation and (a) membership motive and (b) feelings of stress?

PROCEDURE: 15 four-person groups were formed to discuss a case history and to reach a group diagnosis. Following Deutsch, to create differences in cohesiveness, eight groups were given instructions to work cooperatively and seven groups to work competitively. Observers recorded participation and made over-all group ratings. Participants answered questionnaires (nine-point rating scales) relating to effectiveness of experimental instructions, feelings of stress, willingness to work again with group (membership motive), etc. following the group meeting.

Subjects were ranked in order of amount of participation within each group, and mean scores were computed for each condition.

RESULTS: The cooperative instructions produced groups that were significantly more cohesive than competitive groups. Observer rankings of participation were significantly comparable at beyond the .01 level.

High cohesive groups had significantly less stress than Low groups. In High groups, as participation decreases, feelings of stress decrease ( $\rho = 1.00$ ,  $p = .04$ ). In Low groups, as participation decreases, feelings of stress increase ( $\rho = -1.00$ ,  $p = .04$ ).

High cohesive groups had significantly greater membership motive than Lows. In High groups, as participation decreases, membership motive increases ( $\rho = -.80$ ,  $p = .17$ ). In Low groups, as participation decreases, membership motive decreases ( $\rho = .80$ ,  $p = .17$ ).

The  $\rho$  including both conditions between membership motive and feelings of stress is  $-.88$  ( $p = .01$ ).

Observers rated the high participants in High groups as most group-centered, and the high participants in Low groups as least group-centered.

CONCLUSIONS: Participation is differentially related to membership motive and feelings of stress, depending upon the nature of the field situation. As Lewin suggested, there is a negative relationship between membership motive and low feelings of stress.

Lewinsohn, Peter M. *see* Osler, Sonia F.

Lewis, Donald J., & Duncan, Carl P. (*Northwestern University*) **Resistance to extinction of a slot-machine-playing-response as a function of the pattern of reinforcement.**

The purpose of the present experiment was to determine if a slot-machine-playing-response which

had been rewarded only 50% of the time during acquisition would be more persistent in the face of failure than a similar response which had been rewarded 100% of the time.

The Ss, both men and women, were drawn from the introductory psychology course at Northwestern and were placed at random into two groups, 30 in one and 29 in the other. The apparatus was a standard slot machine, modified so that *E* could determine on which plays it would or would not pay off. The Ss played the machine with metal discs, drawn from an unlimited supply. Group I received a pay-off (one disc) on each of the first 8 plays; Group II received a pay-off on only half of the first 8 plays. After 8 plays, neither group won again. The Ss were told that they could play as long as they wanted and that when they quit they would be given a nickel for each pay-off. The machine contained an automatic counter that cumulated the total number of plays for each *S*.

Because the distributions were positively skewed, a transformation to log values was completed which satisfactorily normalized the data. A *t* ratio was computed between the mean log number of plays for each group. For 57 *df*, *t* was significant, using a two-tailed test, at approximately the 3% level.

Our conclusion was that a partially reinforced slot-machine-playing-response was more resistant to extinction than a continuously reinforced one. We believe that this finding provides some support to the notion that the persistence of gambling behavior is a function of partial reinforcement.

**Liccione, John V. (Marquette University) The changing family relationships of adolescent girls.**

This investigation concerns the changing relationships of adolescent girls to their parents. According to orthodox Freudian theory (the framework used in this study), the following trends would be expected during adolescence: (a) Relationships between girls and their mothers should be characterized by more conflict and less tranquility than their relationships with their fathers. (b) The peak of tension and disequilibrium between mother and daughter should occur at puberty or shortly thereafter. (c) Correspondingly, the least amount of tension or disequilibrium between fathers and daughters should occur at the pubertal period. These predicted relationships represent the hypotheses to be examined.

Twelve Thematic Apperception Test cards were administered to 50 girls at each of ages 9, 11, 13, 15, and 17. The stories were electrically recorded and analyzed mainly to identify themes relating directly to parent-child relationships, utilizing a lengthy check list of themes classified as "interpersonal," "intra-

personal," and "impersonal," and as "disequilibrium" (tension) and "equilibrium." Reliability of the analysis, as determined by comparison with an independent observer's results and later self-check, proved satisfactory.

Approximately 25% of the 14,662 themes dealt specifically with parent-child relationships. Parent-child "disequilibrium" themes outnumbered "equilibrium" themes about five to one. Age trends of parent-child disharmony and their statistical reliabilities were determined for a number of specific parent-child relationships.

Significantly greater interaction (both disharmony and harmony) in the mother-offspring than in the father-offspring relationships was noted at all five age levels. The proportions of the mother-offspring themes classified as equilibrium and disequilibrium approximately equaled the proportions of father-offspring themes of an equilibrium and disequilibrium type, suggesting the greater mother-offspring disharmony to be a function of greater interaction of mothers and daughters.

**Lieberman, Seymour. (Survey Research Center, University of Michigan) The relationship between attitudes and roles: a natural field experiment.**

**PROBLEM:** A number of studies point to relationships between people's attitudes and their social roles. In industrial studies, for example, it has almost invariably been found that foremen are more pro-management than rank-and-file workers, and union stewards are more pro-union than nonstewards. Are these relationships a function of "selection" (i.e., people who hold attitudes appropriate for a role tend to be chosen for that role), or are they a function of "role adaptation" (i.e., people who are placed in a role tend to take on attitudes appropriate for that role)?

**PROCEDURE:** In September 1951, questionnaires dealing with management and the union were administered to 2,499 workers in a unionized factory situation. During the next 12 months, 23 of these workers were made foremen and 35 were elected as stewards. In November 1952, the questionnaires were readministered to the two groups who had changed roles and to two matched control groups who had not changed roles. "Selection" was measured by comparing the initial characteristics of workers who later changed roles with those of the rest of the worker population; "role adaptation" was measured by comparing the "before" and "after" attitudes of those who changed roles, using the control groups as base lines.



**RESULTS:** The major determinant underlying attitudinal differences between foremen and workers and between stewards and nonstewards was found to be "role adaptation" rather than "selection." A worker's chances of becoming a foreman or steward were closely related to his education, seniority, skill level, and similar "ability" variables but bore little relationship to his attitudes toward management and the union. But once he was placed in the foreman or steward role, relatively sharp and immediate changes in his management and union attitudes occurred. The implications of these findings for role theory and organization theory will be discussed.

**Lincoln, Robert S., & Alexander, Lawrence T.** (*Johns Hopkins University and The Rand Corporation*) **Preferred patterns of motor and verbal responses.**

This experiment was concerned with the identification of spatial and sequential preferences displayed in a series of human responses.

The Ss were presented with a panel of eight small discs equally spaced to form the outline of either a square or a circle. The panels were mounted on a table at an angle of 60° from the horizontal.

The Ss were instructed to generate a series of responses by repeatedly selecting the different discs in a random manner. Selections were made by touching metal discs with a stylus or by reporting code names printed on paper discs. Both methods of response were combined with the square and circular panels. Each of 32 Ss made 2,800 responses under one of the four resulting conditions. The relative frequency of various possible responses was used as an index of preference.

The Ss exhibited a pronounced spatial stereotypy in their responses. With the square panel they consistently selected the mid-points of the figure more frequently than the corners. The Ss who used the motor response showed a consistent gradient of preference extending from the most preferred positions at the bottom of the figures to the least preferred at the top. Results with the verbal response depended upon the stimulus panel, while results with the circular panel depended upon the type of response. The spatial preferences within all conditions were found to be significantly different by means of a non-parametric analysis of variance.

The frequency of various pairs of responses was found to be inversely related to the distance between the members of the pairs for both panels and both types of response.

A multivariate information analysis indicated that the predictability of the responses increased when the previous and second previous responses were

identified. Verbal responses made with the square panel were the most predictable. (Slides)

**Lindley, S. B.** *see* Gordon, M. H.

**Lindsley, Ogden R., & Skinner, B. F.** (*Department of Psychiatry, Harvard Medical School, Department of Psychology, Harvard University, and Department of Mental Health, Commonwealth of Massachusetts*) **A method for the experimental analysis of the behavior of psychotic patients.**

**PROBLEM:** To determine the applicability of operant conditioning techniques in the experimental analysis of the behavior of psychotic patients.

**SUBJECTS:** 15 male patients with an average age of 38 years, hospitalized an average of 17 years, selected without respect to psychiatric classification.

**METHOD:** Patients were conditioned to pull levers; candy and cigarettes, or projected colored slide images were the reinforcing stimuli. Each patient was studied 1 hr. a day for a total of approximately 70 hr. each. Two schedules of intermittent reinforcement were used: a 1-min. variable-interval and a fixed-ratio of 20. Responses were recorded on counters and cumulative-response recorders.

**RESULTS:** Rates of response on the 1-min. variable-interval schedule ranged from 0 to 140 responses per minute. The records showed highly stable individual differences in over-all rate per hour and in the pattern of rate changes within the hour. The relation of these differences to other variables awaits further analysis.

On the fixed-ratio schedule clear-cut "fixed-ratio breaks" in response rate followed reinforcement. These breaks are characteristic of the performance of lower organisms on this schedule.

**CONCLUSIONS:** The behavior of the psychotic patient can be successfully investigated with operant conditioning techniques. The behavior generated is stable and predictable and provides a uniform base line for investigating pharmacological and physiological variables. The similarity between the performance of psychotic patients and the performance of "normal" rats, pigeons, and dogs on two schedules of intermittent reinforcement suggests that psychotic behavior is controlled to some extent by the reinforcing properties of the immediate physical environment, and that the effects of different schedules of reinforcement upon the behavior of psychotics should be investigated further.

This research was conducted in the Laboratory for Behavior Research at the Metropolitan State Hospital, Waltham, Massachusetts, and was supported by grants from the Office of Naval Research, the

Rockefeller Foundation, and the Milton Fund of Harvard University. (Slides)

**Logan, Frank A., Beier, Eileen M., & Ellis, Robert A.** (*Yale University*) **The effect of varied delay of reward upon acquisition and extinction of a running response.**

**PROBLEM:** The design of partial reinforcement experiments confounds the effects of varied delay and varied magnitude of reinforcement. The purpose of this experiment is to determine the effect of varied delay of reinforcement upon acquisition and extinction of a running response.

**SUBJECTS:** 24 naive hooded rats, maintained on 24-hr. feeding rhythm.

**APPARATUS:** A 4-ft. alley equipped for separate measurement of starting time and running time in each foot of the alley. Food was delivered automatically.

**PROCEDURE:** Ss were given one trial per day. Fifty acquisition trials, with constant magnitude of reward, were followed by 21 extinction trials. Running order was varied systematically.

Animals were randomly divided equally among 3 groups. For the experimental (varied delay) group, delay of reward was varied randomly, 1 sec. on half the trials, 9 sec. on the remaining half. For one control group (long delay), delay of reward was always 5 sec., mid-point of delays for the experimental group. For the other control group (short delay), delay of reward was always 1 sec.

**RESULTS:** Running speed of the varied delay group increased at about half the rate of the short delay group to approximately the same asymptote. Both the varied and short delay groups ran significantly faster than the long delay group at asymptote. The same relationships among the groups obtain for starting speed. Rate of learning varies directly with nearness to the goal, from positive to negative acceleration. Extinction asymptote and relative extinction rate were the same for the three groups.

**CONCLUSIONS:** Performance under varied delay of reinforcement is discussed in relation to the results of several partial reinforcement studies. The relationship of rate of learning to distance from the goal is consistent with the Spence analysis of delayed reward learning. (Slides)

**Long, Eugene R.** *see* Henneman, Richard H.

**Loovas, Ivar** *see* Ax, Albert F.

**Lord, Edith** (*Veterans Administration*), & **Hsu, Francis.** (*Northwestern University*) **Cultural variations in reactions to color on the Rorschach.**

**PROBLEM:** This study explores reactions to color on the Rorschach as a variable of culture; records of

Chinese of Honolulu are contrasted with those of North Americans.

**SUBJECTS:** 96 normal Chinese ranging in age from 16 to 70.

**PROCEDURES:** Individual Rorschachs were administered by Hsu, an anthropologist whose native tongue is Chinese. They were scored by Lord, a psychologist. Reactions to color were compared with relevant studies of North American Ss: Beck's "normal" Chicago sample and Mitchell's study of card preferences by "normals." Results were jointly interpreted by the authors.

**RESULTS:** Chinese hold different values for the color cards than do Occidentals; first in rank order of preferences for the latter was Card X, preferred by 43% against 4% of the Chinese. First ranked by Chinese was Card II, preferred by 41% against 2.4% of the Occidentals. (Red and black are traditional Chinese festival colors; black as a symbol is neither bad nor sad.) Not before rank 4.5 does an all-color card, VIII, appear in Chinese order of choices. (Pastels are uncommon in Chinese art.) However, 78% of the Chinese included VIII among the "liked" group of cards, giving it first place by this criterion, though "liked best" by only 5%.

Chinese differ in frequencies and ratios of color determinants from Chicagoans; e.g., *FC*, *CF*, *C* means for the latter were 1.4, 1.4, .5; for the Chinese, 2.7, 1.5, .3. *M:Sum C* were 3.5:2.9 and 2.5:3.3, respectively.

**CONCLUSIONS:** The Chinese Ss differ from North American mainland Ss in reactions to color on the Rorschach. This finding is not an indication of psychopathology nor of lack of "normality." All deviations from Western world expectancies can be explained and understood within the framework of the traditional Chinese culture, with special reference to the emotional life allowed and fostered by that culture.

**Lorge, Irving, Tuckman, Jacob, & Dunn, Michael B.** (*Institute of Psychological Research, Teachers College, Columbia University*) **Human figure drawing by younger and older adults.**

**PROBLEM:** To compare drawings of the self of a sophisticated young adult group of graduate students with those of older Ss.

**SUBJECTS:** 77 students in a graduate course on the psychology of the adult, and 104 Ss from 60 to 90 years of age, partly from an institution for the aged and partly from recreational day centers for old people in New York City.

**PROCEDURE:** Ss were asked to draw a picture of themselves, standing, facing front view as if they were looking at themselves in a full-length mirror. For

graduate students, the time limit was 6 min.; for older Ss, there was no time limit.

**RESULTS:** In contrast to the drawings of the self by graduate students, the drawings by older people are characterized by incompleteness, lack of integration, one or two dimensionality, lack of proportion, bizarreness, and evidence of inadequate motor coordination. Drawings by older persons may be used as one kind of evidence of the intactness of physiological and psychological adjustment. (Slides)

**Lorge, Irving** *see* Dunn, Michael, Fishman, Joshua A., Tuckman, Jacob

**Lorr, Maurice, Holsopple, James Q., & Turk, Elizabeth.** (*Veterans Administration*) **Development of a measure of severity of mental illness.** (Sponsor, Maurice Lorr)

**PROBLEM:** 1. To develop for evaluation of treatment a measure of severity of mental illness derived from judgments which are based on interview observations.

2. To discover which determinants, if any, clinicians use regardless of theoretical bias in estimating severity of illness.

**SUBJECTS:** Four samples of 20 veterans receiving psychotherapy in four mental hygiene clinics.

**PROCEDURE:** *a.* Psychotherapists in two mental hygiene clinics identified 10 patients regarded as among the least ill in the clinic and 10 patients regarded as most severely ill. The therapists (psychiatrists and psychologists) then described these patients on the Multidimensional Scale for Rating Psychiatric Patients, Outpatient Form (MSRPP). This factored rating schedule consists of 49 brief graphic rating scales descriptive of patient behavior, symptoms, and inferred attitudes and needs. In clinic A, 13 scales could be scored so as to separate completely the 10 patients mildly ill from those 10 designated severely ill. In clinic B 10 mildly ill and 10 severely ill patients, selected according to the same instructions used in clinic A, were again completely separated by means of the same scoring system. Biserial correlation coefficients (for the combined group) between each of the 13 scales and the criterion groups were all significant at the 1% level or higher.

*b.* To check these findings with clinicians who were not aware of the purpose of their ratings, psychotherapists in several other clinics described 20 patients currently in treatment, and later rated them on a scale of severity of illness. Correlations between severity of illness and MSRPP scales were again computed.

**CONCLUSIONS:** Clinicians in widely separated clinics appear to agree as to their concept of severity of illness which may be defined by four factors measured by the MSRPP. A relatively small number of varia-

bles can be used to differentiate the mildly ill from the severely ill in an outpatient adult clinic.

**Lovell, Constance, & Metfessel, Milton.** (*University of Southern California*) **Comparison of the methods of single and multiple stimuli by means of the constant sum method.**

The constant sum method, which involves assigning a total of 100 points to specified alternatives, is a general technique which may be used in conjunction with such psychometric scaling procedures as the methods of single stimuli, rank order, and paired comparisons. In terms of the number of items to which the constant sum is assigned, the standard methods reduce to two: single and multiple stimuli. A key difference between these is the context for comparison. In the former it is the universe of the items and their quantitative relations as experienced in the past by each judge. With the latter, comparisons are made only among the items in the set. The purpose of this methodological study was to investigate the interrelationships of the two methods by using the constant sum procedure with each.

A number of groups, averaging about 25 college students each, were asked to make constant sum judgments of photographs using a variety of dimensions (e.g., tension, pleasantness). Single and multiple presentation methods were employed.

The items and dimensions used did not permit analysis of the results in terms of physical measurements. A technique of analyzing the numbers assigned to ranks (rather than to items) was used to reveal relationships. It showed that, when the same ratio was common throughout the dimension with multiple presentation, a common ratio was also produced in one half of the dimension with single stimuli. Adaptation level, as defined by Helson, was in evidence when the constant sum method was used with single stimuli, but not with multiple stimuli. Further comparison of the methods was made in terms of anchor points and of dimensional placement. The latter suggested the value of combined use of the two methods.

**Lucas, Charles M.** (*Cedar Crest College and Educational Testing Service*) **A factorial study of experimental tests of integration, judgment, and planning.**

Three factors which may likely be related to success in certain specific major fields of college or certain specific occupations are integration, judgment, and planning, which have in the past been isolated and tentatively identified by Army Air Force psychologists. The purpose of the present study was to attempt to more definitely establish factors in this cognitive area as a first step toward the development



of new aptitude tests for use in educational and vocational guidance.

A correlation matrix based on 30 test scores was factor analyzed. Among these scores were those of standard factorial reference tests of general reasoning, inductive reasoning, verbal, spatial relations, number, and visualization. Also included were experimental tests of spatial reference, integration, judgment, and planning. All tests were administered to 666 U. S. Navy officer candidates. Ten factors were extracted and the orthogonal reference frame was rotated to oblique simple structure. Five of these factors were identified as already-established factors; three "new" factors were identified; and two factors were considered as residuals and left essentially uninterpreted.

The three factors which appeared to be "new" or not already established were tentatively identified as integration, spatial reference, and possibly planning. The proposed judgment factor failed to emerge in this analysis, each of the two strongest judgment tests obtaining its highest loadings on one or the other of the two residual factors.

The results of this study indicate the following immediate direction that future research in this area might take. Additional and improved tests of the proposed factors to insure overdetermination of structure and a subsequent reanalysis are indicated. This might enable a more conclusive establishment of the "new" cognitive factors, tests of which might later serve as better predictive measures of success than are now available for certain specific educational and vocational fields.

**McAdams, Walter J.** *see* Evans, Richard I.

**McAllister, W. R.** *see* Ramond, Charles K.

**McCabe, Frank J.** (*Metropolitan Life Insurance Company*) The effect of light-dark ratio, sex, and age upon critical flicker frequency.

**PROBLEM:** Previous flicker studies on light-dark ratio (LDR) have been limited by (a) small number of Ss used, and (b) lack of controls on age and sex. This study was designed to determine the effect of these variables on larger groups of Ss.

**SUBJECTS:** 80 Ss free of visual pathology, with 20 Ss (10 males and 10 females) in each of four age groups: 22-26, 47-51, 62-66, and 77-81.

**PROCEDURE:** Five LDR's were used: 1:9, 3:7, 5:5, 7:3, and 9:1. Each S was tested on all five ratios in randomized order. The method of limits was used and 12 readings were recorded for each S. Constant flash intensity (164 mL) was employed.

**RESULTS:** Graphical analysis indicated that the 5:5 ratio produced the highest CFF, the 3:7 ratio being second highest. Higher ratios lowered the CFF values

considerably. Separate analyses of male and female curves indicated that males had higher CFF values in the two younger groups, with females higher in the two older groups. Analysis of variance was performed by age, LDR, and sex on: (a) group CFF means, (b) group standard deviations, and (c) group average intra-individual variability. In all three analyses the sex  $\times$  age interaction was significant, neither sex nor age being significant as a main effect. The effect of LDR was significant in the analyses of CFF group means and intra-individual variability. Further analysis using *F* ratios and *t* tests indicated that the 3:7 ratio was most effective in discriminating between age groups.

**CONCLUSIONS:** (a) CFF is maximum when 5:5 and 3:7 ratios are used; (b) relationship between CFF and LDR is essentially similar for all age groups; (c) 3:7 ratio produces greatest discrimination between age groups; (d) the data for each sex should be studied separately in flicker experiments. (Slides)

**McCandless, Boyd R.** *see* Levitt, Eugene E.

**MacCaslin, E. F., & McGuigan, F. J.** (*Human Resources Research Office, George Washington University*) The relationship between rifle steadiness and rifle marksmanship and the effect of rifle training on rifle steadiness.

**PROBLEM:** A few previous studies suggest a high relationship between steadiness and rifle marksmanship. For example, Humphreys, Buxton, and Taylor, using a test of rifle steadiness, report an *r* of .72; Spaeth and Dunham, using an arm-and-stylus test, report a rho of .65. In addition, an unpublished study by Belton, Blair, and Humphreys fails to find that rifle training affects rifle steadiness. The aims of the present study were (a) to estimate the relationship between rifle steadiness and rifle marksmanship and (b) to determine the effect of rifle training on rifle steadiness.

**SUBJECTS:** The study was replicated twice with light infantry basic trainees as Ss, once at Fort Knox, Kentucky, with 148 Ss, and once at Fort Jackson, South Carolina, with 200 Ss.

**PROCEDURE:** Steadiness was measured by a rifle ataxiameter test. Data for the marksmanship criteria were obtained in four days of M1 rifle firing on an Army rifle range, during which period each trainee fired a total of 210 shots in slow and sustained (rapid) fire exercises.

**RESULTS:** Reliability of the ataxiameter test was about .85; of the slow fire criterion, .86; and of the sustained fire criterion, .82. Although a significant relationship was found between rifle steadiness and slow fire, it is much lower than that reported in previous research. The correlations obtained with

sustained fire were generally low and insignificant, but all were of the same sign. The reconciliatory hypothesis that the relationship between rifle steadiness and rifle marksmanship may grow as the level of skill increases is not borne out by an examination of the data. The data support Belton, Blair, and Humphreys' unpublished evidence in failing to find that rifle training affects rifle steadiness. (Slides)

**McCleary, Robert A.** (*University of Michigan*)  
**Neural implications of interocular transfer in the goldfish.**

Since the optic nerves of fish are completely crossed at the chiasm and there is a well demarcated commissural system between the two optic tecti, the fish is an excellent organism with which to study the phenomena of interocular transfer. An understanding of how the transfer is neurally mediated might shed light on the more general problem of how two different primary reception centers come to have command of a common response system during the course of a learning experience. The first step in such a study is the satisfactory demonstration of interocular transfer in the fish. The current literature is equivocal on this point.

**SUBJECTS:** Ten goldfish.

**PROCEDURE:** A technique for monocularly blinding fish in an easily reversible and harmless manner has been developed. It is accomplished through the use of an opaque, plastic "eyecup" that is held in place by the eyelid. The training and testing apparatus presents the fish with a three choice-point visual discrimination problem. Special precautions in the design of the apparatus were necessary to compensate for the extreme visual-field defect in a monocularly blinded fish.

**RESULTS AND CONCLUSIONS:** Interocular transfer does occur in the goldfish. The best conclusion appears to be that such transfer is immediate and complete. There are several alternative neural routes by which transfer could be mediated. (Slides)

**McDowell, Arnold A.** (*University of South Dakota*)  
**The immediate effects of single dose whole body X radiation upon the social behavior and self-care of caged rhesus monkeys.**  
 (Sponsor, Roger T. Davis)

**PROBLEM:** The purpose of this study was to determine immediate effects of single dose whole body X radiation (400 r.) on social behavior of caged rhesus monkeys and on their activities of self-care.

**PROCEDURE:** 16 monkeys were observed, two at a time, for 16 days. Ten experimental and six control animals were randomly chosen, and the experimental animals were radiated. Observations were continued for 32 days after radiation. Two 10-min. observations

were tape recorded each day (8 A.M. and 5 P.M.). The order of observation was randomized using permuted latin squares. Each observation was transcribed and analyzed.

**TREATMENT OF DATA:** Results were ordered, following a previously reported taxonomic scheme, to determine frequencies of different behaviors (other-animal-involved, self-involved, inanimate-object-involved, and specific activities in which object involvement was not discernible). Only the first two kinds of behavior are treated here, the latter two having been previously reported. The other-animal-involved behavior units were further divided into units involving specific other animals, and the specific things done relative to the specific other animals were enumerated. Comparisons between preradiation and postradiation and between experimental and control groups were made using the *t* test.

**RESULTS:** The following significant changes were found in the experimental group: (a) reduction in total other-animal-involved behavior units and behavior unit activities; (b) reduction in discrete instances of aggressive activity involving other animals; (c) reduction in visual attention to the activities of other animals; (d) specific increase in resting embrace, the posture of sleep, on postradiation days 13-16; and (f) increase in discrete instances of self-grooming activity. The control group did not show these changes and differed significantly from the experimental group in respect to them after radiation but not prior to radiation.

**CONCLUSION:** A social behavior deficit, especially in aggressive activity and visual attention, and an increase in self-care are clearly a part of the radiation syndrome in rhesus monkeys.

**McGaughran, L. S.** *see* Moran, L. J.

**McGinnies, Elliott, Altman, Irwin, Vaughan, Willard, & Smith, Clagett.** (*University of Maryland*)  
**The mental health film in community discussion group situations.**

It has generally been assumed that the mental health film provides a useful device for stimulating discussion of mental health concepts and problems in community groups. The purposes of the present study were: (a) to devise techniques for recording discussions in both large and small groups following presentation of such films, (b) to develop methods of analyzing the "process content" and the "topical content" of such discussions and of relating these to socioeconomic characteristics of the discussants, (c) to study changes in the dynamics of the discussions of two groups during three consecutive meetings.

Subjects in the present study were approximately 400 members of PTA and child-study groups in

suburban Washington. The 11 groups studied ranged in size from 17 to 96 and varied with respect to a number of background factors. Five mental health films were studied in relation to groups of different size and composition.

The techniques developed for recording discussion under various conditions in community settings will be described. A procedure was developed by which discussants could later be identified with their verbal comments as well as with questionnaires which they had completed anonymously.

From the data thus far obtained, certain generalizations may be drawn concerning the extent and nature of group discussions as a function of (a) group leadership, (b) size of the group, (c) socioeconomic composition of the group, (d) type of film presented, and (e) familiarity of the group with mental health concepts. The implications of these preliminary findings for future research with community discussion groups will be indicated.

This research is being conducted under special grant from the National Institute of Mental Health, United States Public Health Service. (Slides)

**McGuigan, F. J.** *see* MacCaslin, E. F.

**McGuire, Carson** *see* Kundra, John, Slabodkin, Irving

**Machover, Karen.** (*Kings County Psychiatric Hospital, New York*) **The body image in art communication.**

Observations gleaned from the study of the work of a well-known creative artist pose problems concerning the nature of creative genius and the basis of success of communication in art. In the perhaps unwitting and witting utilization of clinically derived principles of body meanings and combinations this artist has, one might say, displayed a union between the clinical and esthetic considerations of art production. This was, perhaps, made possible because the art method and clinical technique both concentrate on the body, which is the central factor in human experience. The artist's spontaneous insights with regard to body-image values can be demonstrated to show an almost point-to-point correspondence to the clinical principles that have been worked out from records of nonartists and are applied in the understanding of the drawing of the human figure as a projective technique of personality analysis. This fact is particularly noteworthy since the artist is presumably clinically untutored.

The artist who will be discussed deals with many levels, stages, and roles in human experience. He is at times quite literal and direct, and at other times rather complicated in his symbolism. Yet, he never

fails to greet the viewer with drawings that stimulate instant, spontaneous, and intimate feelings, regardless of theme. It may be postulated that the rapport between artist and viewer may in part be a result of the artist's genius in setting down, in art forms, the very lines, proportions, perspective, placement, and other formal attributes of a drawing, and even the type and relationships of body parts that constitute the common body experience of most people. In short, he is talking in a direct and perhaps partially unconscious body language. Samples of the artist's work will be used to demonstrate this harmony of esthetic projection and clinical principles of interpretation of human figure drawings. (Slides)

**MacKenzie, Jean N.** *see* Rodgers, Robert R.

**Mackie, Robert R., Wilson, Clark, L., & Buckner, Donald N.** (*Management and Marketing Research Corporation, Los Angeles*) **Interrelationships between aptitude test scores, performance in submarine school, and subsequent performance in submarines as determined by ratings and tests.**

A large number of studies have been made, within both military and industrial settings, that have been concerned with the relationships between aptitude test scores as predictors and grades in technical training courses as criteria.

Left unanswered by most of such studies are the questions: (a) What is the relationship between aptitude test scores and more ultimate criteria of on-the-job (shipboard) performance than school success? (b) What is the relationship between school success and criteria of on-the-job (shipboard) performance?

This study is concerned with the interrelationships of scores on a wide variety of aptitude tests, class standing in Basic Enlisted Submarine School, New London, and three measures of shipboard performance including: (a) ratings on a scale of ten general performance traits; (b) ratings on a check list of specific task items oriented toward the technical aspects of performance; and (c) actual tests of performance using a representative battery of job sample tests.

The Ss in the study were striker and third class enginemen and electrician's mates serving aboard submarines in the Pacific and Atlantic fleets.

Analysis of results led to the following findings and conclusions:

1. Selected aptitude tests will predict shipboard performance (as reflected by job sample tests) rather well ( $R = .62$  for electrician's mates;  $R = .56$  for enginemen).



2. Selected aptitude tests will predict Submarine School class standing to about the same extent ( $R = .61$ ; cross-validated,  $R = .55$ ).

3. Submarine School class standing is only moderately related to performance on job sample tests aboard ship ( $r = .40$  in each of two independent samples).

4. Ratings are, *at best*, moderately related to job sample test performance in spite of high reliability (.85) and satisfactory interrater agreement (.70).

5. Ratings tap an important area of nontechnical shipboard performance which job sample tests do not.

6. Written job knowledge tests of a multiple-choice type correlate only moderately (circa .40) with job sample performance tests. (Slides)

**McQuitty, Louis L. (University of Illinois) A method of pattern analysis for isolating typological and dimensional constructs.**

**PROBLEM:** To develop a method for analyzing responses to test items which would have the following characteristics: (a) be appropriate to categorized data, (b) analyze any kind of interrelationships, (c) indicate the nature of constructs inferred to explain the interrelationships as either dimensional, typological, or typodimensional, and (d) produce a parsimonious solution.

**SUBJECTS:** The method is applied to the responses of nine supervisors who described either a "best" or a "poorest" mechanic on 26 test items.

**PROCEDURE:** Equations are provided for computing indices of similarity between (a) individual patterns of responses and (b) categories of individual patterns. An individual pattern is the responses which an individual gives to the items of a test. An index of similarity between two individual patterns is the number of items on which they agree minus  $1/(k-1)$  times the number on which they disagree, where  $k$  equals the number of response alternatives to each item. An index of similarity between two categories of patterns is a mean of the individual indices obtained when each individual pattern of each category is paired with every one of the other category. These indices, together with an iterative procedure, are designed to classify individual patterns into species so that each individual pattern has a higher index with its species than with any pattern not in its species. Higher-order classifications, such as species into genera, are achieved in an analogous fashion.

Typological constructs are indicated when categories of responses are uncorrelated, dimensions when they are correlated, and typodimensions when two categories of responses have a high negative correlation and define a bipolar dimension which produces a bimodal distribution of scores.

**RESULTS AND CONCLUSIONS:** The method was developed and illustrated. Typological and typodimensional constructs were indicated. Different typodimensions were indicated for the assessment of various subjects on a complex criterion.

**Mahut, Helen. (McGill University) Breed differences in the dog's emotional behavior.**  
(Sponsor, D. O. Hebb)

**PROBLEM:** The relation between motivational processes ("personality") and body type is a long-standing problem. The present study attempted to investigate the question of fear of innocuous objects in different breeds of dogs.

**SUBJECTS:** 101 dogs, of ten different breeds, from private homes.

**PROCEDURE:** For the purposes of a first survey, a simple testing procedure was necessary, especially since testing was done in the homes, in the presence of the dogs' owners. Five objects (mechanical snake, inflated balloon, musical top, hallowe'en mask on owner, suddenly-opened umbrella) were presented in a fixed order. Detailed records of behavior were made, without interpretation. Later, in evaluating the experimental observations, 6 criteria of emotional behavior were used: (a) no apparent response to test object, (b) "curiosity" (investigation of the object), (c) "teasing" of object, (d) diffuse excitement with alternating approach and avoidance of object, (e) "wariness," (f) clear-cut avoidance (escape from the test situation).

**RESULTS:** Frequency comparisons by chi square show significant differences in avoidance ( $p < .001$ ) and teasing behavior ( $p < .001$ ) among the ten breeds. There were no significant differences in the remaining four types of responses. The evidence indicates also that teasing behavior and avoidance are not on the same continuum—not differences in degree of disturbance, but qualitatively different responses. The results with these two variables are unrelated to body size, sex, and age. Prior experience or training does not appear to be a significant variable.

**CONCLUSIONS:** The present data support an interpretation of emotional behavior that recognizes the importance of constitutional factors.

**Malloy, John P. (Marquette University), & Neidt, Charles O. (University of Nebraska) A technique for keying items of an inventory to be added to an existing test battery.**

The purpose of this study was to determine the relative effectiveness of keying the items of an inventory to be added to an already existing test battery according to (a) the correlation of the item responses with the total variation in a criterion (first-semester average course marks) and (b) the correlation of

the same item responses with the criterion variation unexplained by other tests in the battery. Two sets of keys were constructed based upon the responses of 155 Ss. Each inventory of 154 Ss constituting a cross-validation group was then scored using the two keys. The zero-order correlations between the score derived from each key and the criterion were found to be identical for the 154 Ss in the cross-validation group. When the two scores were combined with others in a test battery, the contribution to the predictive effectiveness of the total battery made by the key derived from correlating item responses with the unexplained variation was found to be significant. There was an increase in the multiple correlation coefficient from .515 to .587. The contribution made by the key derived from correlating item responses with the total criterion variation was found to be not significant. The multiple *R* increased from .515 to .517.

The empirical results from this investigation indicate that the deviate technique is superior to the external criterion technique for keying items of a new test to be added to an already existing battery.

**Malmo, Robert B., & Smith, A. Arthur.** (*Allan Memorial Institute of Psychiatry and McGill University*) **Forehead tension and motor irregularities in psychoneurotic patients under stress.**

**PROBLEM:** Previous studies had shown that motor reactions of psychoneurotics were generally characterized by irregularities. The main purpose of the present investigation was that of seeking a tensional measure comparable with measures of motor irregularity in discriminating between patients and controls.

**SUBJECTS AND PROCEDURE:** In order to avoid the complicating factors of headache proneness, 31 non-headache-prone patients were compared with 32 normal controls, in reaction to our pain-stimulation situation. Measures included "nervous" movements, avoidance movements, muscle potential fluctuations, and mean levels of muscle tension from six muscles (forehead, neck, right forearm flexors and extensors, left forearm flexors and extensors).

**RESULTS AND CONCLUSIONS:** Results provided an unequivocal answer to the question that was raised. Frontalis muscle was by far the best discriminator between patients and controls. In fact, with headache-prone patients excluded, the neck and forearm muscles showed very poor differentiation between psychoneurotics and controls. These findings seem to fit well with data from factorial analysis, showing poor correlation of frontalis with the other five muscles, but significant correlation with measures of motor irregularity. As in previous studies, these irregu-

larities also differentiated well between patients and controls. Present findings are discussed in relation to the problem of anxiety in psychoneurosis.

This investigation was supported by the Medical Research and Development Division, Office of The Surgeon General, Department of the Army, under Contract No. DA-49-007-MD-70. (Slides)

**Malt, Ronald** *see* Webb, Wilse B.

**Maltzman, Irving** (*University of California, Los Angeles*), & **Eisman, Eugene.** (*University of California, Riverside*) **A study of two kinds of set in problem solving.**

**PURPOSE:** The purpose of this study was to determine whether sets in problem solving induced by the antecedent conditions of training and of task instructions have the same functional characteristics.

**SUBJECTS:** 96 Ss were employed, 12 in each of the eight different conditions.

**PROCEDURE:** Anagrams were used as the problem materials. Those presented during training had only one possible solution. Anagrams presented in the test series had multiple solutions. The solution referring to an aspect of eating was designated a set solution.

During training half the Ss received anagrams that could be solved by an eating word. Half of these Ss received instructions to look for eating words and the other half received no special task instructions. The remaining 48 Ss received anagrams that were all in the same letter order. The word solutions were not related to eating or any other category in a consistent fashion. Half of these Ss received instructions to look for a given letter order and half received no special task instructions.

Each of the above four training groups was divided into two subgroups for the test series. Half the Ss were instructed to look for eating solutions. The remaining Ss received no special task instructions.

**RESULTS:** The experimental design permitted a  $2 \times 2 \times 2$  factorial analysis of variance of the incidence of set solutions on the test series. The results showed that none of the interactions was significant. Only the main effects of training and test instructions were significant.

**CONCLUSIONS:** The experimental results indicate that the disposition to respond in a given manner, set, induced by training has different functional characteristics than the disposition induced by instructions. The former develops as a function of repeated experience and tends to persist. The latter is elicited immediately following instructions and need not persist.

**Maltzman, Irving** *see* Eisman, Eugene

Mark, Joseph C. *see* Morrow, Robert S.

Marks, Eli S. (*National Opinion Research Center*)  
Tests of hypotheses for cluster sampling and unequal probabilities.

The formulae and procedures given in statistical textbooks for testing significance apply to samples such that each observation within any group is selected independently and with equal probability. Many samples involve some "clustering" in the selection of the observations and unequal probabilities of selection. Modern techniques for selecting samples depend, in fact, very heavily upon such procedures as clustering and selection with unequal (but known) probability. For these cases it is necessary to modify the procedures for tests of significance. Formulae for this purpose are developed covering the general situation in which clusters of cases are sampled independently with stratification and unequal probabilities and then are subsampled. The formulae are, of course, applicable to sampling without stratification (i.e., with a single stratum), with equal probabilities or without subsampling. Essentially the formulae involve making from each cluster an unbiased estimate for the stratum from which it was selected and then applying the usual techniques with appropriate adjustment for size of stratum. The paper includes a discussion of the applicability of assumptions of normality and equal variance.

Marks, Melvin R., & Uhlaner, Julius E. (*Personnel Research Branch, The Adjutant General's Office*) The prediction of night field performance by vision tests administered under low illumination.

**PROBLEM:** Night operations play a significant role in modern warfare. Hence, night-vision measures have considerable operational significance. The problem of this study was to develop a test for measuring visual acuity at mesopic light levels (levels between extreme blackout and daylight). Portability, economy, and a self-contained, calibrated light source were also sought-after features of the test.

**RESEARCH:** Several visual acuity tests were administered under mesopic conditions ( $6.67 \log \mu\text{L}$ ) in an instrument with characteristics described above, to 256 infantrymen at Fort Benning, Georgia. The targets of the visual acuity tests had been preselected on the basis of empirical item difficulties and reliabilities at various light levels. Dark-adaptation time had been predetermined empirically to be 10 min. for the mesopic level used.

The criterion measure was a score on a night field-detection course. The course involved presenting each S with 66 "multiple-choice problems"; these involved the perceptual judgment of whether the human "ag-

gressor targets" were standing, kneeling, prone, or absent. Aggressor positions and distances from S were randomized. The course consisted of 6 parallel lanes, each 15 ft. wide. Eight Ss could observe simultaneously in one lane without score compromise. Scores on this field-detection course were then correlated with scores on the test targets.

**RESULTS:** Obtained validity for a mesopic Letter Test was .35. This contrasted with a Scotopic Landolt Ring Test for which validity was .21. Reliabilities of the predictors obtained in another study ranged from .64 to .92. For 72 Ss test-retest criterion reliability was available. Reliability was .46 in the present study, for the N of 72.

**CONCLUSION:** Field night-vision ability can be predicted with reasonable efficiency using a portable, relatively inexpensive instrument test that is suitable for fairly rapid measurement.

Mathers, Boyd L. *see* Willard, Norman, Jr.

Matter, Jean, Bruner, Jerome S., & O'Dowd, Donald D. (*Harvard University*) "Response" versus "principle" in reversal learning.

**PROBLEM:** When an animal learns an LRLR alternation pattern through a four-unit T maze, he may be learning a set of specific position responses or he may be learning the "principle of single alternation." If the former, then a reversal to RLRL should result in negative or negligible transfer. If the latter, however, there should be positive transfer or saving in shifting from LRLR to RLRL.

**SUBJECTS:** 60 albino rats, aged 80 days at the outset.  
**PROCEDURE:** A four-unit discrimination maze was used with two gray doors at each choice point. Animals were taught an LRLR (or an RLRL) single alternation pattern with five trials per night, and after a certain number of trials, were reversed to the mirror image of the original pattern. Half of the animals operated throughout on a 12-hr. deprivation schedule; half on a 36-hr. schedule. These two groups were then each subdivided according to amount of training given on the original pattern before reversal. One third was reversed upon reaching 80% criterion, another after reaching 80% criterion plus 20 additional trials, another after reaching 80% criterion plus 80 additional trials. Thus, six groups of 10 rats each were run.

**RESULTS:** Does strong (36-hr.) motivation predispose more than mild (12-hr.) motivation to response learning as compared to principle learning? Strongly motivated animals learn the original pattern faster than the mildly motivated, but learn the reversal more slowly. Thus in general terms, strong motivation yields negligible transfer; mild motivation, positive transfer. The effect of amount of practice on reversal ability is highly complex.



**DISCUSSION:** Learning under moderate motivation leads more to acquisition of a response principle (i.e., the principle of single alternation without regard to position), whereas learning under strong motivation is more likely to lead to the acquisition of specific responses.

**Matyas, Seymour M.** *see* Findlay, Donald C.

**May, R. B.** *see* Gordon, M. H.

**Mayzner, Mark S., Jr., & Kendler, Howard H.** (*New York University*) **The influence of rigid and flexible training methods.** (Sponsor, Howard H. Kendler)

**PROBLEM:** To determine the effects of rigid and flexible training methods on different types of test situations.

**SUBJECTS:** 60 undergraduates.

**PROCEDURE:** Four sets—A, B, C, and D—of ten (5-letter) anagrams each comprised the training series, with the solutions within any given set always involving the same letter order. Under one experimental condition (rigid group), the four training sets of anagrams were presented separately in A, B, C, D order. Under the second experimental condition (flexible group), the 40 training anagrams were presented in a mixed up order. Three test series of anagrams were presented to both rigid and flexible groups: Test I—6 Set D letter order anagrams; Test II—6 Set X letter order anagrams (X refers to a different order for each anagram and also different from the A, B, C, or D order); Test III—5 anagrams with the order of solution CBADX. The Mann-Whitney *U* test was used to evaluate the criterion scores, which involved time measures on the test problems.

**RESULTS:** The results of Tests I and II reveal that (a) both the rigid and flexible groups take significantly less time to solve the D than the X test problems; (b) the rigid group requires significantly less time than the flexible group to solve the D test problems; (c) the flexible group requires significantly less time than the rigid group to solve the X test problems. On Test III, generally the rigid group requires less time for solution than the flexible group, but not all the differences reach statistical significance. **CONCLUSIONS:** The results emphasize the importance of the nature of the test situation in evaluating the effectiveness of rigid and flexible training methods. An explanation involving two factors—strength of habit for a given type of solution and response-produced cues associated with a given type of solution—is offered.

This experiment was performed in connection with Project NR150-064, under Contract NONR-187(00)

between the office of Naval Research and New York University. (Slides)

**Meadow, Arnold** *see* Goldberg, Shepard

**Meadow, Lloyd.** (*University of Chicago*) **A study of dyadic relationships in the French family.**

**PROBLEM:** This paper deals with a study of the dyadic relationships of the French family. Four major relationships, the father-son, father-daughter, mother-son, and mother-daughter, were analyzed in terms of a series of hypotheses developed by Margaret Mead and her associates in a Research in Contemporary Cultures Project on French culture. Mead's hypotheses were primarily derived from secondary sources, and it was felt that a clinical study of children living within a French cultural milieu would be a valuable empirical means of testing and adding to these hypotheses.

**SUBJECTS:** From the town of Revel, France, 13 boys and 13 girls with a mean age of 13.2 and a standard deviation of 1.5 years.

**PROCEDURE:** The TAT was judged to be the most appropriate instrument for testing the hypotheses, and 15 of the original Murray cards were presented to each child. The nature of the dyadic family relationships was deduced from an analysis of the protocols using an adaptation of the method developed by William E. Henry.

**RESULTS AND CONCLUSIONS:** Father-son: father seen as disciplinarian and head of household. Participates in education and development of son. No direct aggression toward father. Anthropomorphic and externalized forces vehicle for aggression. Father seen as succoring, protective, and indestructible. Father-daughter: father seen as disciplinarian and head of household but to lesser extent than for boys. Seen as sexually attractive. Relationship keeps within bounds of propriety. Also seen as aggressive and threatening. Mother-son: mother as active as father in role of disciplinarian and as an educator. More aggression shown toward mother than toward father. Seen as affectionate and someone to turn to in times of trouble. Mother-daughter: most strained of all relationships. Chief disciplinarian and teacher. Spiteful and disobedient behavior toward mother. Sexual rivalry with mother. Pronounced ambivalence because of dependency-independency strivings of daughter.

Most of the results agree with the hypotheses set forth by the Mead group. Some of the results present aspects of the relationships not mentioned in the Mead hypotheses. In a few instances there is insufficient evidence derived from the TAT protocols to confirm an hypothesis. The differences in the hypotheses and

the results are discussed and possible reasons for the discrepancies are offered.

**Mednick, Sarnoff A.** (*Northwestern University*)

**Distortions in the gradient of stimulus generalization associated with cerebral dysfunction and schizophrenia.**

The behavior and thinking of brain-damaged patients is sometimes described in the literature as stimulus bound, while the schizophrenic's thought processes have been characterized as being overinclusive. These descriptions and clinical observations suggest that this behavior might in part be subsumed under the relatively well-defined concept of stimulus generalization. On the basis of this suspected relationship a study was designed to test the hypotheses: (a) Damage to the cortex of the human brain is associated with a paucity of stimulus generalization. (b) Schizophrenia is associated with an abnormally high degree of stimulus generalization. (c) A neuropsychiatrically normal group will show a median amount of stimulus generalization.

The Ss were 180 male VA hospital patients. Sixty were normals from the Medical Service; 60 were schizophrenic; 60 were patients with cortical damage. The measurement of stimulus generalization was made by the Brown Spatial-Generalization technique. This method was selected inasmuch as degree of stimulus generalization is defined as the number of errors made. This forces the prediction that the brain-damaged group, showing least stimulus generalization, would make the fewest errors. This was deemed to be an acid test of hypothesis 1.

**RESULTS AND CONCLUSIONS:** 1. Both the normal and schizophrenic groups showed more stimulus generalization than the brain-damaged group ( $p = .0001$ ).

2. Differences in amount of stimulus generalization between the schizophrenics and normals were not significant.

3. Brain-damaged patients whose dominant hemisphere was damaged suffered significantly more diminution in their gradients of stimulus generalization than patients with nondominant hemisphere lesions ( $p = .007$ ).

4. Schizophrenic patients who had received more than 14 electroconvulsive shock treatments showed significantly less stimulus generalization than those who had received less than 14 such treatments.

5. Variables which were not found to be significantly related to degree of stimulus generalization were: age, reaction time, education, and duration of hospitalization.

**Meer, Bernard** *see* Rodgers, Robert R.

**Melching, William H.** *see* Reid, Jackson B.

**Mellinger, Glen, & Pelz, Donald C.** (*University of Michigan*) **The relationship between communication and agreement, as conditioned by interpersonal attitudes.** (Sponsor, Donald C. Pelz)

**PROBLEM:** It often is assumed that communication per se will lead to greater agreement and mutual understanding. The present study tests the proposition that when two persons communicate about an issue, the consequences of the communication will differ, depending on the attitudes of the communicators toward each other.

**SUBJECTS:** 338 professional scientists engaged in medical research in a government organization.

**PROCEDURE:** One section of a questionnaire consisted of a modified sociometric instrument designed to obtain attitudes toward specific colleagues. Interpersonal attitudes were measured along two attraction dimensions: liking and trust. Each respondent also was asked to (a) express his opinion about a particular important issue, (b) indicate how often he had discussed this issue with each colleague named earlier, and (c) estimate how each had answered the same question. In 244 cases it was possible to match the reciprocated responses of a perceiver (S) with those of a perceived (O).

**RESULTS:** 1. Objective agreement: Only under conditions of mutual high attraction do respondents who have discussed the issue agree significantly more often than respondents who have not.

2. Perceived agreement: (a) When S's liking for O is low, communication is associated with increased accuracy in S's perception of O's opinion. (b) When S's liking for O is high, communication is associated with increased accuracy in perceiving agreement, but with decreased accuracy in perceiving disagreement. (c) When O's trust of S is high, communication is associated with an increase in S's accuracy in perceiving O's opinion. (d) When O's trust of S is low, communication is associated with an increase in S's accuracy in perceiving agreement, but with a decrease in accuracy in perceiving disagreement.

**CONCLUSIONS:** While communication may be a necessary condition of agreement and mutual understanding, these data demonstrate that it is not a sufficient condition of either. Perceptual and interactional mechanisms are postulated to account for the findings.

**Melton, Richard S.** (*University of Minnesota and Naval School of Aviation Medicine*) **A study of the relative accuracy of counselor judgments and actuarial predictions.**

**PROBLEM:** The relative accuracy of clinical and actuarial predictions has recently become the focal point of the nomothetic-idiographic controversy. The argu-

ment was translated into experimental terms by Allport, who called for studies on the relative efficiency of predictions made from case studies as opposed to those made by actuarial methods.

The literature revealed a scattering of such studies on a limited number of criteria—success in training, recidivism, institutional adjustment, and psychiatric prognosis—but in most of these the clinical-actuarial comparison was reported merely as an incidental finding. Allport's belief that clinical predictions would prove superior was not supported in most of the reports.

**SUBJECTS AND DESIGN:** During the University of Minnesota's 1949 summer orientation program 14 counselors were asked to make predictions of the first-year grade averages of entering freshmen, following a one-hour interview. During the first five weeks actuarial predictions were made independently by the author from a table based on high school performance and ACE test scores. A total of 543 students comprised the sample. During the sixth week half of the counselors used the actuarial table as an aid in making their predictions.

**RESULTS:** The mean error for all counselors during weeks one through five was significantly larger than that of the actuarial table ( $p < .01$ ). The mean error of the counselors who used the actuarial table during the sixth week was also significantly larger than that of the table ( $p < .01$ ).

**CONCLUSIONS:** Clinical predictions have not proved to be superior to statistical predictions. Even when using the actuarial table as an aid, the counselors in this sample were not able to do better than the table itself.

**Mendola, Vincent S. (Fordham University) The validity of indices of dependency in clinical tests.**

**PROBLEM:** To investigate on an experimental basis the validity of dependency indices commonly employed in clinical tests.

**SUBJECTS:** 90 white, male neurotics who were outpatients in a mental hygiene clinic. These Ss were divided into two groups: (a) an experimental group of 45 dependent Ss, and (b) a control group of 45 nondependent Ss. The Ss were selected by two judges on the basis of case-history manifestations of dependency, and were matched on a group basis for age and educational level.

**PROCEDURE:** The research sample was given the following battery of tests: (a) Rorschach, (b) drawing of the human figure, (c) multiple-choice picture test, and (d) questionnaire. The Rorschach and Figure-Drawing tests were selected since many of the dependency indices used by clinicians are found in these

two tests. Two additional tests, the picture test and the questionnaire, were constructed specifically for the present study. The picture test consisted of 20 pictures representing one or more individuals in which various interpretations of dependency were possible. The questionnaire test consisted of 60 items, 30 of which were indicative of dependency and 30 of nondependency. With the projective tests, the validity of the dependency indices was evaluated by both a sign and clinical approach. The former was based exclusively upon the presence of the dependency indices, while the latter utilized the total test record and other indications of dependency, as well as counterindications. The objective tests were limited to a total dependency score. In all cases, the results were correlated with the outside criterion of dependency, consisting of the case-history estimate of dependency made earlier by the two judges.

**RESULTS:** The Rorschach test was related significantly with the outside criterion of dependency in both the sign (.05 level) and in the clinical (.01 level) approach. The two objective tests were related significantly (.01 level) to the same criterion. Only the Figure-Drawing test failed to provide a significant relationship.

Meredith, William *see* Ax, Albert F.

**Miller, Neal E., & Kessen, Marion L. (Yale University) Is distension of the stomach by a balloon rewarding or punishing?**

A previous study showed that 14 cc. of milk injected directly into the stomach can be used as a reward to produce learning by a hungry rat. Will a similar amount of stomach distension produced by inflating a balloon serve as a reward?

In a chronic operation, balloons were inserted into the stomachs of seven albino rats and connected to little plastic tubes that projected to the back of the neck. Then the animals were trained in a T maze when hungry. The two ends of the maze were distinctive: after making a choice, the animals remained in the goal box for 10 min. If they chose the correct end (different for different animals), the balloon was inflated. If they chose the incorrect side, nothing happened. Rats were given two trials a day. The first was a free-choice trial used to measure learning; the second, a forced trial to the opposite side. Training continued for 50 days.

The percentage of choice of the inflation side for the first 15 trials was compared with that for the last 15.

The comparison of the percentage of choices of the inflation side of the first 15 and last 15 trials showed a tendency to *learn to avoid* the inflation side. In this experiment, stomach distension by the balloon seemed to serve as a punishment, while in the



previous experiment the same amount of distension by milk injected directly into the stomach served as a reward. Comparison of these two procedures yielded a  $t$  of 4.8 and a  $p$  of .0005. (Slides)

Miller, Neal E. *see* Roberts, Warren W.

Miller, R. E., & Finocchio, D. V. (*Department of Clinical Science, School of Medicine, University of Pittsburgh*) **The performance of rats in the acquired-drive apparatus in the absence of fear.**

**PROBLEM:** The present study was designed to determine the course of learning in the Neal Miller apparatus for the acquired drive when fear was not present.

**SUBJECTS:** 17 young, male, Carworth rats approximately 120 days old at the beginning of the experiment.

**APPARATUS:** The Neal Miller acquired-drive apparatus was utilized.

**PROCEDURE:** The rats were thoroughly tamed for three weeks prior to the beginning of learning trials. The first 10 trials in the apparatus were familiarization trials. Then trials were given during which  $E$  dropped the door when the rat approached it.

Finally, the door was closed. The animal was placed in the white compartment and could open the door by turning a wheel or pressing a bar. When criterion was achieved in either task, it was made inoperative and the alternative response was required to open the door.

The animals were never given an electric shock in the apparatus. Furthermore, the animals were fed and watered ad libitum throughout the experiment.

**RESULTS:** Fourteen of the seventeen animals (82%) learned one of the responses to criterion. Eleven (65%) successfully learned both tasks. There was no significant preference for the black compartment during the familiarization trials.

Comparisons were drawn between trials to criterion and latency measures between animals in this study and other groups of rats learning with an acquired fear drive. In addition, data from a previous control experiment are compared with the data from the present study.

**CONCLUSIONS:** These data indicate that the demonstration of fear as an acquirable drive in this apparatus was inconclusive. (Slides)

Miller, R. E. *see* Murphy, J. V.

Milligan, Glenn E. (*Findlay College*) **The measurement of misconceptions of freshman college students.**

**PROBLEM:** Will student beliefs and disbeliefs in common misconceptions progress to more acceptable re-

sponses regardless of the courses taken in college?

**SUBJECTS:** 152 college freshman students enrolled at Findlay College.

**PROCEDURE:** An Analysis of Opinions was devised by the writer and administered to students taking Elementary Psychology and to students not taking Elementary Psychology but taking Introduction to Social Science. Only first semester freshman students, without previous college work, were considered in each group. The Analysis of Opinions—106 common-sense statements with approximately a third of them acceptable to psychologists—was administered at the beginning and at the end of the semester. Students could register their agreement or disagreement with each item by placing a check in one of four columns. A comparison was made between the means and standard deviations on the 106-item test within each group and between the two groups. Tests of difference (critical ratios) were obtained.

**RESULTS:** (a) Students in Elementary Psychology taking a test measuring misconceptions at the beginning and at the end of the course did change significantly their opinions toward more acceptable responses. The critical ratio was 15.47, which is highly significant. (b) Opinions of college students change toward more acceptable answers during a semester even though a course in Elementary Psychology is not taken. This change was just barely significant at the .05 level, which has a critical ratio of 2.04. (c) A one-semester course in Elementary Psychology is far more effective in correcting misconceptions of college students than a general college program that omits this subject from its curricula. The critical ratio was 7.56, which is highly significant.

**CONCLUSION:** Student beliefs and disbeliefs in common misconceptions do progress to more acceptable responses regardless of the courses taken in college, although a course in Elementary Psychology would seem to help students progress much faster than they do without such a course.

Millon, Theodore. (*University of Connecticut*) **An experimental investigation of some personality and situational correlates of rigidity and the tendency to structure.**

**PROBLEM:** The fact that conflicting evidence had been reported regarding the covariance between authoritarian attitudes and ambiguity-intolerant behaviors suggested the need for scrutinizing situational conditions under which investigations were conducted. Such review led to the hypothesis that correlations between these variables would be best obtained when subjects respond to relatively unstructured stimuli, or when they are ego involved in task performances. The survey led to the further view that behavior of

authoritarians progressed, sequentially, through two relatively discrete stages. First, there was a tendency to replace the vague and unknown with preconceived or subjectively structured norms (the tendency to structure, TTS), and secondly, once these "known" and structured anchors were established, authoritarians were unable under modified stimulus conditions to change their norms appropriately (rigidity, R).

**SUBJECTS AND PROCEDURE:** Individual laboratory sessions were conducted with 60 college students whose standings on the California F scale were known; 30 were experimentally ego oriented, 30 were task oriented. Two scores were obtained: (a) the number of trials to form a norm while making judgments of the one-light autokinetic phenomenon, as a measure of TTS; (b) the percentage of appropriate shift from one's established one-light norm upon the introduction of a second light, as a measure of R.

**RESULTS:** (a) Over-all intercorrelations among TTS, R, and authoritarian attitudes were significant. (b) Consistently higher correlations were obtained in the ego-oriented group. (c) R scores were not related to authoritarian attitudes in the task-oriented group. (d) Ego-oriented Ss manifested significantly greater R than task-oriented Ss.

**CONCLUSIONS:** (a) Under conditions of ego involvement individuals tend to display greater consistency and congruence in their behavior. (b) The more personally involved an individual is with regard to his norms and values, the more vigilant will be his defense against stimuli that threaten them. (c) The characteristic rigid and structuring behaviors of authoritarians are defensive reactions probably stemming from their tendency to experience ego threat in situations lacking clear-cut norms for behavior.

**Mills, Eugene S. (Whittier College) The effect of the study of abnormal psychology upon personality adjustment.**

**PROBLEM:** The study was designed to test the following hypothesis: The study of abnormal psychology has a measurable effect upon the personality adjustment of some psychology students.

**SUBJECTS:** 21 upper division students enrolled in a course in abnormal psychology and 22 upper division students enrolled in a modern European history course. The *E* had no official connection with either course.

**PROCEDURE:** At the beginning and end of the semester, the Rorschach, a story-completion test, and a questionnaire rating scale were administered to all Ss. In addition, each *S* wrote an autobiography at the beginning of the semester. Both quantitative and qualitative techniques were used in evaluating test material.

**RESULTS:** 1. When evaluated according to the Munroe Inspection Technique, the Rorschach records revealed no statistically significant test-retest changes in adjustment for either group.

2. Theme analysis of the psychology students' responses to the story-completion test revealed a significantly smaller number of escape and depression themes on retest (*t* of 3.41 and 3.62, respectively).

3. The psychology students demonstrated an increased freedom in recognizing and discussing personal problems.

4. The expressed interest in, and concern over, sexual matters on the part of the psychology students at the beginning of the semester remained undiminished at the time of retest.

5. A Spearman rho of .62 was obtained between the Munroe indices of adjustment and final grades in the abnormal psychology course with a tendency for the more poorly adjusted students to make the higher grades. A rho of -.15 was found between Munroe indices and final grades for the history students. The significance of this finding for psychological training will be discussed.

**CONCLUSIONS:** The findings support the belief that the study of abnormal psychology has a measurable effect upon the personality adjustment of some psychology students, and that personality adjustment is significantly related to achievement in this course.

**Milton, Charles** see Moffie, D. J.

**Mirsky, Allan F. (Yale University) The influence of sex hormones on social behavior in monkeys.**

**PROBLEM:** What is the effect of male and female sex hormones on dominant and subordinate behavior in monkeys?

**SUBJECTS:** 18 gonadectomized *Macaca mulatta* (rhesus) monkeys, 9 of each sex.

**PROCEDURE:** Two unisex groups of five, and four unisex groups of two animals were observed daily in a competitive feeding situation, and instances of dominant and subordinate behavior were recorded. After base-line measures of the group structure and interaction had been obtained, various members of the groups were treated with implanted pellets of male or female sex hormones. Three animals of each sex were treated with each hormone, for a total of 12 treatments.

**RESULTS:** In no case was hormone administration accompanied by changes in the group structure or by an increase in the number of instances of dominant behavior. Although 6 of the 12 treatments were accompanied by small but significant decreases in either dominant or subordinate behavior scores, the change in two cases could not legitimately be attributed to

hormone administration, and the changes in the other four show little or no consistency.

**CONCLUSIONS:** The results suggest that gonadal hormones are without effect on unisexed groups of castrate rhesus monkeys and that the observed changes were due to other factors. It is suggested that a species difference underlies the difference between these results and the extensive changes in dominance obtained by Birch and Clark with gonadal hormone treatment of chimpanzees. This species difference appears to be a function of the amount of aggressiveness characterizing the social behavior of the rhesus monkey and the chimpanzee. (Slides)

**Mishkin, Mortimer** *see* Pribram, Karl H.

**Mitchell, Howard E.** (*Veterans Administration, Philadelphia*), **Preston, Malcolm G.** (*University of Pennsylvania*), & **Mudd, Emily Harts-horne** (*Marriage Council of Philadelphia*)  
**Counselor's attitudes toward technique aids to the counseling process.**

**PROBLEM:** Research techniques have been used increasingly in clinical settings in recent years; this study examines problems created by such practices. The objectives are: to study the attitudes of counselors with differing professional backgrounds toward certain research schedules used with clients in the Marriage Council of Philadelphia, to correlate characteristics of the counselors (professional training, sex, status in agency, etc.) with their attitudes toward the research schedules, to study the relationship between attitudes before using schedules and attitudes expressed after experience with them, and to correlate counselors' attitudes with the extent to which they administered schedules to their clients.

**SUBJECTS:** 48 counselors and counselors-in-training at the Marriage Council between November 1948 and May 1953, including 10 social workers, 15 psychiatrists, 8 family life educators, and 8 from other professions.

**PROCEDURE:** Data on attitudes were obtained via two questionnaires. All schedules except one are routinely administered; the one is given at discretion of counselor. Extent to which this critical schedule was used was determined from the agency's records.

**RESULTS AND CONCLUSIONS:** Results give clear indication of difference in initial attitude which is associated with previous training of counselor. In general, experience results in more favorable attitudes toward schedules and in more homogeneity of attitude. Initial attitudes affect the extent to which the critical schedule is used by counselors representing a variety of professional backgrounds. Factors involved may be initial training, demonstrated harmlessness of sched-

ules, usefulness both as research tools and adjuncts to counseling, and atmosphere of agency.

The foregoing results are of interest because they relate to matters of practical import to the conduct of research in clinical settings, raise interesting questions as to the origin of differences in attitudes among groups who differ both in their training and outlook upon the function of a helping agency, and invite consideration of forces producing change in such attitudes.

**Moffie, D. J., & Milton, Charles.** (*North Carolina State College*) **The use of the discriminant function in accident research.**

**PROBLEM:** The purpose of this study was to determine the effectiveness of the discriminant function as a multivariate tool in accident research. Accident statistics are distributed in accordance with the "Poisson" distribution. Consequently, the usual regression techniques have proved ineffective in dealing with accident data. In the trucking industries, drivers can be classified as accident or accident-free. Therefore, these data are adapted to discriminant-function analyses.

**SUBJECTS:** Two groups of 30 drivers each were studied. One group was composed of accident drivers, the other of accident-free drivers. The two groups were matched for exposure or volume of driving.

**PROCEDURE:** The discriminant function was applied to determine maximum differentiation between the two groups. Eight test variables were used for each group. These were: (a) Bennett Mechanical Comprehension Test Score, (b) Kuder Interest-Computational scale, (c) Kuder Interest-Clerical scale, (d) Bernreuter-B1-N scale, (e) Bernreuter-B2-S scale, (f) Bernreuter-B4-D scale, (g) Minnesota Multiphasic-Hypochondriasis scale, and (h) Minnesota Multiphasic-Hysteria scale. These variables were selected from a total of 23, because four differentiated between the two groups at the 1% level and the remaining four were near the 5% level of confidence. *t* ratios were used. The variables used also met the basic assumptions of the method of discriminant function.

**RESULTS AND CONCLUSIONS:** An *F* ratio of 6.63, significant at the 1% level, was obtained through the discriminant-function analysis. Therefore, a reliable discrimination was made between the two groups using this function. This study indicates that multivariate techniques are effective statistical tools for accident research.

**Moltz, Howard.** (*University of Illinois*) **Latent extinction as a function of the reduction of secondary reward value.**

**PROBLEM:** To test the hypothesis that latent extinction (i.e., reduction in the strength of a response tendency



without the response itself having been performed) is a function of the reduction or elimination of the secondary reward value of certain cues present in the learning situation.

**SUBJECTS:** 60 naive, male rats.

**PROCEDURE:** All Ss received 30 trials in a straight alley. Seven of the 10 trials of each day were reinforced. On reinforced trials Ss found food in a white food cup. On nonreinforced trials neither food nor the food cup was present. Following straight-alley training, Ss were trained to a position habit in a T maze. The correct side of the maze always contained a pellet and the food cup.

The stem of the straight alley and the arms and stem of the maze were painted grey. The goal boxes of the maze and the straight alley were identical and were painted black.

On the day following the last learning trial in the maze, Ss were assigned to one of three groups: (a) Group 1—placed in correct goal box for four one-min. periods with food cup *present* (but with no food). (b) Group 2—placed in correct goal box for same length of time with food cup *absent*. (c) Group 3—*not* placed in goal box. The three groups were subdivided into two additional subgroups. The Ss of one subgroup were run to an extinction criterion with the empty food cup present in the previously correct goal box. The Ss of the other subgroup were run to extinction with food cup absent. The dependent response measure was the number of trials *S* required to reach the extinction criterion.

**RESULTS AND CONCLUSIONS:** Analysis of the data revealed that the experimental hypothesis was supported. The results are as follows: (a) the food cup acquired secondary reward value (the condition necessary for testing the hypothesis); (b) placing *S* in the goal box immediately prior to extinction with the food cup present eliminated the secondary reward value of the food cup; (c) placing *S* in the goal box with the food cup absent had no effect (Group 2 did not significantly differ from Group 3); (d) Group 1 gave significantly fewer trials to extinction than either Group 2 or 3.

The results are discussed in relation to S-R reinforcement theory, and their significance for a theory of extinction is considered.

**Monachesi, Elio D.** *see* Hathaway, Starke R.

**Montgomery, K. C.** (*Yale University*) **Novel stimulation and conflict behavior.**

**PROBLEM:** To test the hypothesis that novel stimulation evokes both the fear drive and the exploratory drive, thus generating an approach-avoidance conflict, the resolution of which depends upon the relative strengths of the two drives.

**SUBJECTS:** 30 female Wistar rats, 90 to 150 days old, housed in individual cages containing food and water at all times.

**PROCEDURE:** Two straight-alley mazes 6 ft. long and 4 in. wide were used. One was enclosed, the other elevated. Each could be placed adjacent to the door of each living cage. On each of three days, each rat was given one trial which consisted of opening its home-cage door and allowing it free access to a maze for 10 min. Fifteen rats (Group EN) were exposed to the enclosed maze and 15 (Group EL) to the elevated maze. Records were taken of the number of (a) 8-in. maze sections traversed per minute, (b) approaches to and retreats from the maze entrance, and (c) "looks at" and "looks away from" the maze entrance.

**RESULTS:** All animals exhibited both approach and avoidance behavior as defined in *b* and *c* above, those in Group EL showing a significantly greater amount than those in Group EN. The latter group exhibited a significantly greater amount of exploratory behavior in the maze than the former group. On each of the three days, Group EL showed a gradually increasing amount of maze behavior over the 10-min. period, whereas Group EN exhibited an initial increase followed by a decrease on day 1 which changed to an initial high level followed by a systematic decrease by day 3.

**CONCLUSIONS:** Novel stimulation evokes both the fear drive and the exploratory drive, thus generating an approach-avoidance conflict. The detailed aspects of the results are discussed in terms of conflict theory. (Slides)

**Montgomery, K. C.** *see* Segall, Marshall

**Moran, L. J., Fairweather, G. W., Morton, R. B., & McGaughan, L. S.** (*VA Hospital, Houston, Texas*) **Adjustment to prolonged hospitalization for tuberculosis: I. Prediction of stay response and quit response.**

Every year, almost half of all patients in tuberculosis hospitals leave the hospital against medical advice. The present study is the first of a projected series on the tuberculars' adjustment to hospitalization. Its aim is to devise a method for predicting, on admission to the hospital, whether a patient will stay for definitive treatment or will quit treatment against medical advice.

The clinical records of 268 tuberculous patients, discharged 1949-1952 from a VA hospital, were analyzed for relevant demographic data. Stay-response and quit-response groups were significantly differentiated on 9 of 22 items of information, e.g., occupation, age. A scoring system using these 9 items was then developed and a distribution plotted. Scores above and below two arbitrary cutting points

(50% of total sample) predicted stay or quit response with 90% accuracy. Scores between these cutting points predicted no better than chance.

The scale was then cross-validated on a new sample of 103 successive discharges in 1953. Scoring procedure and cutting points were identical with those used with the original sample. Results: below one cutting point (21% of sample) stay response was predicted with 80% accuracy; above the other cutting point (32% of sample) quit response was predicted with 70% accuracy. The scoring system yielded (with 1 *df*) a *C* of .48,  $p < .001$ , on the cross-validation sample.

Results are discussed in terms of the methodological implications of this scale for a current long-range study, supported by the Veterans Administration, of adjustment to prolonged hospitalization. In this project, the scale is to be used for preselecting, on admission, samples of subjects with known probability of staying in or quitting the hospital. Such a preselection design is compared critically with experimental designs traditionally applied in previous approaches to the problem under study.

**Morrow, Robert S., & Mark, Joseph C.** (*VA Hospital, Bronx, New York*) **The correlation of intelligence and neurological findings on twenty-two patients autopsied for brain damage.**

This study is concerned with the psychological examination of 22 veterans whose main cause of death was structural brain damage as determined by autopsy. Although complete psychological batteries are available on these patients, only the intellectual functioning as measured by the Wechsler-Bellevue Intelligence Scale will be considered here.

Analysis of the results of this test show that the brain-damaged group as a whole differed significantly from a control group of 22 matched neuropsychiatric patients. The vocabulary subtest was a useful indicator of the premorbid intellectual level in that the two groups were practically identical on this test, while the digit symbol subtest showed the most significant difference.

The results of this preliminary effort to correlate locus and type of lesion and performance on the intelligence test are as follows:

1. Four cases were classified as pre-Rolandic (frontal) and 14 cases as post-Rolandic including the predominantly pre-and-post-Rolandic. Four cases with subtentorial and third ventricle lesions were excluded from this immediate comparison. The pre-Rolandic cases were better on this general intelligence test, with the Full Scale IQ of the pre-Rolandic group being 100.3 as compared with the Full Scale IQ of

85.9 for the post-Rolandic group. This difference was a general reflection of the subtle differences.

2. It was not possible to differentiate the focal lesions ( $N = 11$ ) from the diffuse lesions ( $N = 7$ ), although both groups showed impairment usually associated with structural brain damage.

3. The four cases classified as subtentorial ( $N = 2$ ) and third ventricle ( $N = 2$ ) tumors showed the least impairment and they were easily distinguishable from the other cases.

The relationship of these findings to localization theory will be discussed. (Slides)

**Morton, R. B.** *see* Moran, L. J.

**Moss, Gilda** *see* Tuckman, Jacob

**Mount, George E., Hull, Chester D., & Perry, Daniel J.** (*University of California, Los Angeles*) **A palm-palm comparison of galvanic skin response measurement techniques.**

**PROBLEM:** To compare the form of results obtained for a standard and a modified method of measurement of the galvanic skin response.

**PROCEDURE:** A method for the comparison of techniques is described in which advantage is taken of the similarity in response mechanisms represented in bilaterally symmetrical areas of the body. The method is applicable to a determination of the influence of measurement parameters associated with the electrodes, the electrolyte, the electrode placement, and the electrical techniques of measurement.

In the present experiment bilateral responses to stimuli were recorded separately from 10 Ss with zinc-zinc sulfate electrodes placed on each palm using a leg reference electrode. Four different stimulating situations were presented in sequence once and repeated. These measurements acted as control.

Records were obtained on an additional 10 Ss using a technique in which electrodes are placed on the palmar and dorsal surfaces of one hand after the skin area has been rubbed with EKG jelly. This technique has the effect of lowering both the level at which changes occur and the magnitude of the change. Independent simultaneous responses were recorded using a zinc-zinc sulfate electrode on the other palm.

**RESULTS:** Comparisons are made graphically and with rank-difference and product-moment correlations for each S. The results for the control condition demonstrate a high degree of correspondence for similar measurement techniques. Bilaterally recorded responses for the experimental condition show a general similarity in pattern, but with large differences in the relative magnitude of response occurring in the records for some Ss. The product-moment and rank-

difference correlations cover a considerably wider range and are generally lower for the experimental than the control condition. Nonlinear transformations (e.g., logarithmic) of the results for the standard measurement condition modify the individual correlations obtained but do not affect the general form of the results. (Slides)

**Mouton, Jane S.** *see* Fruchter, Benjamin

**Mowbray, G. H., & Gebhard, J. W.** (*Applied Physics Laboratory, Johns Hopkins University*)  
**The differential sensitivity of the eye to intermittence.**

Difference limens for flicker have been measured for white light at 16 frequencies in the range of 1 to 45 cps. The standard and comparison flash frequencies were viewed binocularly at the fovea on the same circular spot. The stimulus spot, which subtended one degree of visual angle, had a homogeneous luminance of 98 mL and appeared on a white surround subtending 71 degrees. The surround was held at a luminance of 44 mL. The standard and comparison stimuli were produced by the same glow modulator tube controlled electronically in frequency, duty cycle, and amplitude. The flash tube closely followed a square wave electrical input resulting in stimuli with a light-dark ratio of 0.5. The flicker frequency was controlled to an accuracy of 0.5 per cent. The *S* viewed the standard and comparison frequencies successively while obtaining ascending and descending matches by the method of adjustment. The discrepancy in the match was measured with an electronic interval timer to an accuracy of 0.5 per cent. Data from two practiced *Ss* show that the absolute discrepancies rarely exceed one cycle, that the average deviations lie in the range 0.1 to 0.85 cps and that the ratio  $\Delta f/f$  is 0.004 to 0.04. The size of the difference limen depends on the frequency and is larger for the middle frequencies (20–30 cps) than for the extreme of the range studied. This surprising capacity of the eye as a temporal analyzer is discussed in relation to similar effects in other senses. (Slides)

**Muckler, F. A.** *see* Ritchie, M. L.

**Mudd, Emily Hartshorne** *see* Mitchell, Howard E.

**Muldoon, John F.** *see* Andrews, T. G.

**Murphy, J. V., & Miller, R. E.** (*Department of Clinical Science, School of Medicine, University of Pittsburgh*)  
**The effect of spatial contiguity of cue and reward in the object-quality learning of rhesus monkeys.**

**PROBLEM:** This study was an investigation of the effect of a 6-in. vertical displacement of the stimulus object

from the site of the response in object-quality learning.

**SUBJECTS:** Eight rhesus monkeys. These animals had previously been *Ss* in a preconditioning study employing shock as the unconditioned stimulus.

**PROCEDURE:** Two groups of four animals were trained on the Wisconsin General Test Apparatus. The apparatus was modified for the present study by constructing a 3-in. platform 6 in. above the food wells on the movable tray. The control animals were trained with the customary procedure in which the choice response is made by moving one of the two objects constituting a problem. For the four experimental animals, the objects to be discriminated were placed on the raised platforms. In this group the food wells were covered by identical white wedges. The reward (piece of preferred food) was placed in the appropriate food well on the movable tray.

The animals were tested twice daily with eight three-trial problems in a test period. When the control animals reached a high level of proficiency, they were switched to the experimental procedure for an additional 192 problems.

**RESULTS:** The control animals acquired the learning set in the usual number of problems. In the experimental group there was a complete failure of the animals to acquire the necessary discrimination. When the control group was switched to the experimental group procedure, their performance was significantly decreased to chance levels. (Slides)

**Murray, Edward J.** (*Yale University and Walter Reed Army Hospital*)  
**An objective approach to the problem of transference in psychotherapy.**

A content analysis derived from learning theory and psychoanalytic theory was applied to verbatim transcripts of seven psychotherapy cases. The present paper is concerned with categories related to the therapist and is aimed at the problem of transference.

The percentage of statements in a given hour which were related to the therapist showed an increase during the course of therapy in all seven cases. The average hourly percentage was reliably greater ( $p < .01$ ) in the second half of therapy. The amount of increase was reliably ( $p < .01$ ) correlated with the length of therapy. Regression lines, fitted to each case, all showed a positive slope. The slope was not correlated with length of therapy but was related to the type of patient and the way the therapist dealt with the transference.

An analysis of the categories related to the therapist showed that all types of feelings (e.g., positive, anxious, hostile) increased during the course of therapy rather than a simple increase in positive and a de-



crease in negative feelings. Similarly, all drives (e.g., sex, affection, dependence, and independence) showed an increase.

The content analysis was shown to be reliable. (Slides)

**Nafe, J. P., Kenshalo, D. R., & Baker, H. D.** (*Florida State University*) **The nature of touch adaptation: nerve discharge as a function of stimulus movement.**

Cessation of a sensation of a light cutaneous pressure, even though the pressure stimulus remains on the tissue, is usually attributed to receptor adaptation. Another point of view which fits the known facts equally well is that movement of the tissue resulting from its displacement by the pressure is the adequate stimulus. According to this notion, tissue movement rather than static pressure is the stimulus for receptor activity. Lack of sensation, then, represents a failure of the stimulus to stimulate rather than failure of the receptor to respond to the stimulus.

Simultaneous recordings of the activity of a single nerve fiber and the sinking of the stimulus into tissue were made. The preparation used was the under side of the tongue of the rat. The lingual nerve was exposed and teased apart until only a single tactile fiber was active. Stimuli of known areas and weights were lowered onto the tongue at known velocities.

The results clearly indicate that the fiber stopped discharging even though pressure continued on the tongue. The velocity of tissue displacement at the time the discharge ceased was about .01 mm. per sec., but was a function of the size of the fiber from which the record was made.

Although the results do not constitute absolute proof that tissue movement is the adequate stimulus for the receptors of light pressure, they strongly support such an idea. (Slides)

**Naumburg, Margaret.** (*New York State Psychiatric Institute*) **Art as symbolic speech.** (Sponsor, Rudolf Arnheim)

This paper considers the use of symbolic art as a means of communication. Although of more ancient origin, symbolism in art has been less understood in recent times than the use of symbols in mathematics or logic.

The understanding of man's capacity for expression through visual symbols has been aided by the explorations of anthropology and archeology. Awareness of the importance of symbolic images has also been increased by the development of psychoanalysis. The recognition of man's varied use of visual symbols has led to a number of different interpretations of such productions by the artist, the art critic, the psychologist, the psychoanalyst. Among those whose

approaches to symbolic art will be considered are André Malraux, Roger Fry, Laurence Binyon, G. M. Luquet, Thomas Inman, and Franz Alexander. The viewpoints of these authors with regard to the symbolic content and the techniques employed in both primitive and modern art productions will be compared to what psychoanalysis has revealed concerning the unconscious.

It will be shown that the tendency of certain artists and critics to dismiss the art of psychotics as meaningless is based on earlier concepts of nondynamic psychology. Recent findings of psychoanalysis in the successful treatment of psychotics have shown that expressions of mental patients, whether in pictures, gestures, or words, are meaningful attempts to communicate.

Slides showing similarities and differences in the symbolic interpretation of sexual and other symbolism in primitive, ancient, and modern art will be compared to similar imaged projections of neurotic and psychotic patients, produced during art therapy sessions. The spontaneous interpretation by emotionally disturbed patients of their own symbolic art productions may give some clues as to the meaning of similar patterns in the symbolic art of primitive and ancient man. (Slides)

**Nauta, Walle J. H.** *see* Brady, Joseph V.

**Neel, Ann F.** (*VA Hospital, Kansas City, Missouri*) **Conflict, recognition time, and defensive behavior.**

It has been demonstrated that the existence of conflict will affect both recognition time of relevant stimuli and prerecognition behavior. The present research was undertaken in an effort to relate these phenomena to the "derivatives" or "defensive behavior" of personality theorists. It was predicted that: (a) Amount of information required for recognition of situations should differ depending on whether or not the person has indicated conflict surrounding the area, and on the intensity of affect elicited by the situation. (b) The nature of the prerecognition responses should differ with the presence or absence of conflict surrounding the stimuli.

Three groups of female Ss were used. One group was prone to conflict in the area of sex; one to conflict in the area of aggression; the third had no conflict in either area. The Ss were presented with pictures of persons engaged in various sexual and aggressive activities designed to elicit affects of varying intensity. The pictures were shown tachistoscopically, thus controlling the amount of information given to S. The S responded by choosing from a list of alternatives the "best" interpretation of what she had seen.

Recognition varied not only with conflict and intensity, but also with stimulus situation. People with no conflict showed vigilance to stimuli related to mild sexual behavior, and repression of stimuli related to directly sexual situations. In contrast, there was avoidance of stimuli related to mild aggression and comparative sensitivity to directly hostile situations. The sex-conflict group reacted similarly, but less consistently. The aggression-conflict group tended to avoid recognition of all aggressive situations. Pre-recognition responses produced by persons without conflict in response to sex situations were quite undistorted in comparison to the extreme distortion of aggression situations. Prerecognition behavior of conflict groups did not differ.

**Neel, Robert G.** (*University of Kansas City*)  
**Nervous stress in the industrial situation.**

The purpose of this study was to demonstrate the importance of situational factors as contributing to nervous stress and worry in the industrial employee. Mental health programs in industry have in the past emphasized the individual approach and largely ignored the work situation when dealing with worker adjustment. This study was part of a larger study of psychological factors related to morale and productivity. A questionnaire was used to measure attitudes and perceptions of all employees of a company engaged in the manufacturing of heavy equipment. Population used in this report was a one-third sample of hourly employees (blue collar).

Items on the questionnaire concerned with nervousness and worry were intercorrelated. The range of intercorrelations among these criterion items varied widely with the highest correlations being between items which should be logically related, thus indicating some face validity for the criterion variables. These criteria were also correlated with questions about the employees': (a) perception of and attitude toward foreman, (b) attitude toward work group, (c) attitude toward working conditions, (d) attitude toward pay and promotion policies, (e) attitude toward the time study system, (f) attitude toward company, (g) intrinsic job satisfaction, (h) background factors. Items from each of these areas showed significant correlation with the criterion variables of worry and nervousness. While direction of causation was not always indicated, i.e., dislike of the situation causing nervousness or individual nervousness causing dislike of the situation, certain relationships could only be logically explained as the situation increasing nervous tension among employees. Recommendations are made concerning further research and the application of these findings to the industrial situation.

**Neet, Claude C., & Feldman, Robert S.** (*University of Massachusetts*)  
**The effect of electroconvulsive shock on fixated behavior when administered concurrently with tests for fixation.**

**PROBLEM:** To determine whether the effects of electroconvulsive shocks are dissipated during the temporal delay between shocking procedures and attempts to alter stereotyped behavior.

**SUBJECTS:** 35 male albino rats.

**PROCEDURE:** All rats were trained to respond on a modified Lashley jumping apparatus. They were then subjected to an insolvable problem for 16 days, 10 trials per day; they were punished 50% of the time in random order. This situation generally led to stereotyped responses, either to a position (left or right) or to one of the windows (bright or dark). Next, all rats were presented with a solvable bright-dark discrimination problem for 20 days, 10 trials per day or until a rat reached the learning criterion.

All rats that failed to learn within the 20-day test were considered fixated and were then given an electroconvulsive shock, one per day, for 25 days. Twelve hours after each shock, the rats were continued in the same solvable problem.

**RESULTS:** Of the 27 rats that failed the first learning test, only 15% solved the problem when the test was continued with the concurrent addition of electroconvulsive shock. These results were compared with those of a previous study, in which fixated rats were given a series of 25 daily electroconvulsive shocks followed by a second learning test, which showed that 3 out of 12 (25%) of the animals were able to solve the problem and 4 out of 13 (30%) of a control group which received no shock were able to solve.

**CONCLUSION:** The lack of significant differences between the percentages tends to indicate that concurrent applications of electroconvulsive shock yield no more alteration of stereotyped behavior and formation of adaptive responses than when testing follows a shock series, and it is concluded that it is unlikely that the lack of effect of electroconvulsive shocks on stereotyped behavior can be explained by temporal dissipation of the effects of shock on response alteration. (Slides)

**Neff, Walter S.** (*Jewish Vocational Service, Chicago*)  
**The use of the Rorschach test in differentiating between vocationally rehabilitable and nonrehabilitable groups.**

**PROBLEM:** The chief question to which this paper addresses itself concerns the degree to which the Rorschach test is of value in assessing the employability of the vocationally handicapped. The framework of the study is an ongoing project, being carried

on in cooperation with the Illinois Division of Vocational Rehabilitation, in which emotionally, mentally, and/or physically handicapped persons, who have been deemed unemployable, are administered an 8-week adjustive work experience in a sheltered workshop which closely simulates actual factory conditions. The beneficial results of this program are reported elsewhere.

**PROCEDURE:** As part of a battery of entry tests, all clients were administered the Rorschach some weeks prior to their participation in the program and then were retested with the Rorschach during the final week of the 8-week work period.

**SUBJECTS:** 32 persons (15 male and 17 female), deemed unemployable by a variety of social agencies. Age range was 17 to 60, with two-thirds being below 30. Fifteen Ss (Group A) were evaluated as employable at the close of the work period, the remaining 17 (Group B) as unemployable.

**DATA AND RESULTS:** The Rorschach protocols were scored and interpreted independently of the final evaluation as to employability made by the workshop supervisor. In addition, a Rorschach "Maladjustment Score" (cf. Fisher) was worked out for each protocol. The data were examined quantitatively with the use of both *t* comparisons and analysis of variance; each case was also examined qualitatively with a view to determining the direction of change, where change occurred. Our results show (a) in individual cases, vocational rehabilitation may take place as a consequence of an adjustive work experience, without any observable change in personality pattern; (b) for the group as a whole (i) the initial Rorschach is not an efficient predictor of vocational rehabilitation, but (ii) the terminal Rorschach dependably differentiates between the rehabilitated and nonrehabilitated subgroups, in that the Rorschachs of the rehabilitated group tend to "improve" while those of the nonrehabilitated group tend to "worsen"; (c) age was a factor in this group, the younger Ss showing somewhat greater initial disturbance and less improvement than the older.

The results are discussed and typical cases are reviewed. (Slides)

**Neidt, Charles O.** *see* Malloy, John P.

**Neimark, Edith D.** (*Tulane University*) **A factorial analysis of final level of responding in two probability learning situations.**

**PROBLEM:** To investigate final level of responding after verbal conditioning under partial reinforcement as a function of: (a) treatment on "nonreinforced" trials, (b) number of response alternatives available, (c) relationship between response and reinforcement. Reinforcement in the present context refers to appearance of a light above one of three telegraph keys.

**PROCEDURE:** Eight groups of 20 Ss each received 100 trials in an individualized modification of Humphreys' verbal conditioning procedure under a schedule of .66 partial reinforcement of one response,  $R_1$ . The treatment of the groups, arranged in a three-dimensional factorial design, differed with respect to: (a) whether two or three responses were available to S, (b) whether nonappearance of reinforcement or reinforcement of an alternative response constituted the treatment on "nonreinforced" trials, (c) whether reinforcement was contingent upon or independent of S's response. Four control groups of 20 Ss each received 66 trials in which  $R_1$  was continuously reinforced.

**RESULTS:** Group curves of mean relative frequency of  $R_1$  in successive 10-trial blocks were compared. Curves for all groups in which reinforcement of an alternative response constituted "nonreinforcement" approached an asymptote of .66. For groups in which no response is reinforced on "nonreinforced" trials, the asymptote is a function of type of conditioning procedure: curves for groups in which reinforcement is contingent upon S's response approach a final level of circa .82; curves for groups in which reinforcement is independent of S's response approach the same final level as the control groups, but at a more gradual rate. Differences between groups differing only in the number of available response alternatives are not significant.

Observed final levels of  $R_1$  were not significantly different from final levels predicted from a statistical theory of learning.

**CONCLUSION:** Nonappearance of reinforcement on "nonreinforced" trials results in a significantly higher final level of responding than reinforcement of an alternative response, especially when reinforcement is independent of S's response. The number of available response alternatives has no effect in the present situation. Predictions of final level of responding developed from a statistical theory of learning are supported for all groups. (Slides)

**Nelson, V. L.** *see* Baker, C. T.

**Neuhaus, Edmund C.** (*Baldwin Public Schools, Baldwin, N. Y.*) **A personality study of asthmatic and cardiac children.**

This is an abstract of a thesis submitted in partial fulfillment of the requirements for the degree of PhD in psychology at New York University, February, 1954.

This study investigates the following hypotheses:  
I. Asthmatic children exhibit personality patterns that differ from normal healthy children.



II. Asthmatic children show personality traits that are related either to the specific character of the illness or to the fact of being chronically ill.

Hypothesis I is tested by comparing test results of asthmatics with those of matched normal controls. Hypothesis II is tested by comparing asthmatics with cardiacs to determine whether differential personality traits are present in each illness or whether there are distinctive personality patterns common to both illnesses. Cardiacs are also compared to a matched normal control group. Both sick groups are compared with their well siblings.

Sixty-eight sick children, 68 matched normals, and 49 siblings, age 8 through 14, from the Baldwin Public Schools were tested. Children were matched on age, IQ, socioeconomic status, religion, and number of siblings.

The Rorschach, Brown Personality Inventory, and Despert Fables were employed in the study. The *t* test was used to test for significant differences between the major groups, and age and sex subgroups.

The following conclusions were indicated: (a) Asthmatic children are more maladjusted than normals. Their personality is characterized by anxiety, insecurity, and dependency. (b) Cardiacs exceed normals in degree of neuroticism and dependency. (c) There is a similarity in personality make-up of sick children and their siblings. (d) No significant differences were found between the asthmatics and cardiacs. The data indicate the existence of personality traits common to both illnesses, and conceivably common to protracted illnesses in general. (e) No sex differences were found. (f) While the total sick population displays a general maladjusted pattern, it is more intense in younger children.

**Neumann, E., Ammons, C. H., & Ammons, R. B.**  
(University of Louisville) **Differential forgetting of a perceptual-motor skill as a function of retention interval.**

**PROBLEM:** To determine the effect of no-practice intervals up to 12 months on the retention of a serial paired-associate perceptual-motor task and its components (Schlosberg Board).

**SUBJECTS:** 100 male college students.

**PROCEDURE:** Ss learned a circular sequence of eight randomly paired toggle switches to a criterion of two consecutive perfect trials, taking an average of 37 trials. Groups of 20 Ss each were retested immediately, and after 20 min., 2 days, 7 weeks, and 12 months, relearning to the same criterion.

**RESULTS:** It was found that: (a) Ss took longer to relearn the longer the retention interval; (b) correct responses on the first relearning trial were fewer the longer the interval; (c) Ss used verbal cues with

varying frequency, but times to learn and to relearn were not significantly different for the various verbalization levels; (d) the marked serial position effect found during learning, similar to that in serial verbal learning, appeared again during relearning, and was more pronounced the longer the retention interval; and (e) individual items (pairs) were relearned more quickly the more reinforcements they had received during learning.

**CONCLUSIONS:** (a) Loss of perceptual-motor skill is gradual but marked over a period of 12 months. (b) Appearance of the serial position effect is not dependent upon use of serial verbal materials or on verbal methods of learning perceptual-motor skills. (c) The hypothesis that less well learned habits are proportionately more rapidly forgotten does not appear to be tenable for this kind of task.

**Nevis, Edwin C.** (Worthington Associates, Inc.)  
**The effectiveness of the Worthington Personal History Technique in assessing leadership potential.**

**PROBLEM:** To determine the effectiveness of the Worthington Personal History Technique in assessing leadership potential.

**PROCEDURE:** As part of a larger leadership evaluation research project, a six-page modification of the Personal History was administered to over 300 Air Force captains. The protocols of 100 of these officers were analyzed according to the Worthington system, in which each item is scored in reference to 26 personality variables. To evaluate the comparability of Personal History assessments with those made independently by other methods, Personal History variables were used to predict the composite ratings of 10 psychologists on 30 assessment variables. These were derived by the University of California's Institute of Personality Assessment and Research during an intensive living-in assessment which combined many clinical and situational measuring devices.

Personal History assessments were also validated against two sets of performance criteria. One set consisted of six factors extracted from a centroid solution of 47 job performance ratings obtained by means of the Personnel Research Institute's Job Concept Interview. The other was composed of three factors derived from a centroid solution of superior ratings gathered specifically for this research project. **RESULTS:** Using patterns of Personal History variables—each formulated as being the equivalent of a criterion assessment rating and specified prior to analysis of the sample protocols—correlations ranging between .01 and .56 were obtained between Personal History and criterion assessments. Scores based on these patterns were also correlated with appropriate

performance factor scores. The 26 validity coefficients ranged from zero to .52. These results, as well as additional evidence of the technique's validity in this situation, are discussed. Several findings of possible value to future leadership research are also presented.

This study was conducted at the Personnel Research Institute of Western Reserve University under sponsorship of the Human Resources Research Institute, Contract AF 18(600)-420.

**Newman, Herbert M.** (*Brooklyn College*) **Variety in the recall and recognition vocabularies of high school and college students expressive of common concepts.**

**PROBLEM:** The development of a varied vocabulary in expressing common concepts is a prominent objective of English instruction. Yet there has been noted a paucity of vocabulary in the written expression of pupils, even those in high school and college. This investigation was undertaken to determine the extent to which such students possess underlying abilities of recall and recognition of words representing each of several concepts, and to examine certain hypotheses advanced to explain the possible inhibition of these abilities from their realization in actual expression.

**SUBJECTS:** 2,479 Ss were studied, at four school levels: high school freshman, high school junior, college freshman, college junior.

**PROCEDURE:** For each of 16 frequently expressed concepts, such as "big" and "beginning," the ability to recall representative words was elicited by providing for the completion of a theme; the underlying ability to recognize such words, by calling for their selection from among matched nulls.

**RESULTS:** Parallel sets of the mean number of words recalled and recognized for each of the 16 concepts indicate development from one school level to the next. Taking all concepts together, these means are, respectively: high school freshman 5.3, 15.8; high school junior 6.8, 21.1; college freshman 10.1, 27.7; college junior 11.5, 31.6. Where recall and recognition might be compared for the same group of words, a ratio of 1:4 was obtained, consistent at all levels. The careers of each of 754 words in recall and in recognition have been traced through the four levels in terms of percentages of Ss responding appropriately.

**CONCLUSIONS:** A considerable degree of accomplishment has been found in the underlying abilities here studied, in contrast to that deplored in actual written expression. Characteristic profiles of individual words give evidence of the operation of several hypothesized frequency and nonfrequency factors inhibiting the realization of these abilities.

**Newman, Joseph.** (*VA Hospital, Memphis, Tennessee*) **An evaluation of prefrontal lobotomy as a means to improve the hospital adjustment of chronic psychotic patients.**

The present study was undertaken in 1948 to investigate the hypothesis that bilateral prefrontal lobotomy results in such modification in behavior as to make chronically psychotic patients who were disturbed, agitated, hyperactive, assaultive, or self-destructive less so. There was to be no necessary expectation of remission in psychosis.

The population upon which the study is based was a series of 25 male patients selected according to specific criteria. Diagnostically, these patients turned out to be schizophrenic and in their general characteristics, they resembled the schizophrenic populations usually reported in the literature.

The experimental design was one that involved repeated measurements of the same Ss. In this case, there were pre- and postoperative measurements. The preoperative condition constituted the control situation; the operative intervention was the experimental variable; and the postoperative condition was the experimental situation. The postoperative period of observation was one year. Three groups of criteria were used—psychiatric, behavioral, and psychometric. The hypotheses for all criteria were that there would be positive significant change as a result of prefrontal lobotomy.

The psychiatric criteria were obtained from reports prepared by the psychiatrists attending the patients at three evaluative points: prelobotomy; 3 months postlobotomy; and 12 months postlobotomy. The psychometric criteria consisted of eight psychological tests and were applied at the same evaluative intervals as for the psychiatric criteria. The data for the behavioral criteria were obtained directly from the nurses' daily notes and were summarized for each month for 12-months prelobotomy and 12-months postlobotomy. The test of significance applied was through the calculation of probabilities using the binomial.

The results for the psychiatric criteria showed that no significant change took place as a consequence of lobotomy. Differences in the direction of improvement were noted in the areas of orientation, cooperativeness, productivity of speech, and in relevance and coherence of speech. On the basis of the psychiatric criteria, it was concluded that there was no change effected in the psychosis of any of the Ss at the end of 12 postoperative months.

The results for the behavioral criteria revealed positive and significant change for each criterion. Most striking and significant was the elimination,

for the most part, of the necessity for restraining these Ss in one way or another.

For the psychometric criteria, there were, first of all, increases in the number of scorable test records obtained after lobotomy. The results on the tests themselves indicated significant positive changes in memory functioning and in disturbed thinking that persisted for 12 months after lobotomy. For the other test criteria, the positive changes that did occur were either transient or indicated differences in the positive direction at levels of significance beyond 5%.

The conclusion drawn from the present investigation was that prefrontal lobotomy had a significant effect in improving the behavior of the chronic, hospitalized psychotic patients who comprised the study population so as to make their care less of a problem. Other implications of the results are discussed.

**Newman, Slater E., & Highland, Richard W.**  
(*AF Personnel and Training Research Center, Chanute AFB*) **An experimental comparison of several methods of technical instruction.**

**PROBLEM:** To compare the postmessage examination performance of students who have been taught by a method which maximizes the information-giving function of the instructor (Instructor Group) with performance of students who have been taught by (a) a tape-recorder-plus-workbook; (b) a supervised reading; or (c) a tape-recorder-plus-slide method of instruction.

**SUBJECTS:** 417 airmen awaiting attendance at the Airman Electronics Fundamentals Course, Kessler Air Force Base.

**PROCEDURE:** Classes of the Instructor Group ( $N = 64$ ) were taught a five-day course in "Principles of Radio" by either of two instructors who were rated well above the average in instructional ability by their supervisors. Similar content was presented to each of the other experimental groups ( $N = 64$  for each group) through one of three methods in which the information-giving role of the instructor is minimized. All four groups were matched on Electronics Technician Aptitude Index score. An examination of 117 items, chosen from an original 205 items on the basis of item-analysis information, was administered to classes of all four groups at the end of the five-day course. This examination was administered also to a matched Control Group ( $N = 161$ ) who underwent no training.

**RESULTS AND CONCLUSIONS:** An analysis of variance applied to the examination scores of the four experimental groups yielded the following results: (a) The variance attributable to methods was not significant. (b) The variance attributable to aptitude level was

significant (.001 level). (c) The variance attributable to methods  $\times$  levels interaction was not significant. (d) The variance attributable to methods  $\times$  parts of the course interaction was significant (.01 level).

The implications of this research for "mass-communication" research are discussed.

**Nicolay, Robert C.** (*Loyola University*) **The influence of the position of failure upon levels of aspiration.**

The hypothesis to be tested in this experiment is that the position at which failure occurs is one of the determinants of level of aspiration.

To test the hypothesis 200 college men were divided into 10 groups. None of the Ss had ever worked on a pursuitmeter, and no S was included who had any gross observable behavior disorder. The Cornell Index Form N-2 was administered to eliminate persons with serious personality problems and to give evidence that the group was essentially normal. The Ss were placed in the experimental groups according to their initial level of aspiration. Since fictitious scores were assigned, an interview after the experiment was used to ascertain whether Ss accepted the scores as their own.

After four practice trials each S was given ten 30-sec. trials on a pursuitmeter rotating at 60 revolutions per minute. Before each trial Ss were asked to predict their scores. To experimentally induce success and failure a silent timer was attached to the pursuitmeter and a prearranged sequence of scores with verbal comments was given before each prediction. One group received success on all trials. All other groups received failure on one trial by being given a lowered score and the statement, "That was quite poor." Failure was administered to one experimental group at each position.

Analysis of variance revealed significant differences in goal-discrepancy scores of groups experiencing failure at different positions. Groups experiencing failure at early trials scattered their predictions significantly more than success groups. These groups continued to scatter their predictions more than success groups. These groups continued to scatter their predictions more than other groups on all subsequent trials. Middle or late failure did not significantly scatter the predictions. Consistent success was accompanied by diminishing scatter of predictions.

Within the limitations of the experimental setting, the hypothesis that the position of failure influences level of aspiration is verified. For diagnostic purposes early failure seems valuable, since it elicits greater individual variability of predictions. Where consistency of predictions is desired, success is more efficacious. Future experiments should consider posi-



tion of failure as one of the determinants of level of aspiration.

**Noble, Clyde E.** (*Louisiana State University*)  
**The difficulty-complexity relationship in compound trial-and-error learning.**

**PROBLEM:** To determine the functional relationship between behavioral difficulty and task complexity in solving multiple-response problems.

**SUBJECTS:** 336 adult male humans.

**PROCEDURE:** The reference task was one of paced, four-link heterogeneous chain learning with immediate serial reinforcement under seven conditions of response availability, task length constant. Using a simple randomized design, the following ratios of correct to available responses were introduced: 4/4, 4/5, 4/6, 4/7, 4/8, 4/9, 4/10. To stimuli presented for 2 sec. each at a 3.44-sec. rate with a 6.88-sec. inter-trial interval, *S* was required to master an invariant sequence of four push-button operations. Response availability ( $N_R$ ) was manipulated by means of a set of detachable covers for the reaction keys.

By a logical extension of Hull's general behavior theory for the case of  $N_R = 2$ , it was deduced that: (a) the initial probability of reaction evocation (*i*) will be an inverse function of  $N_R$ ; (b) difficulty will be a positive logarithmic function of task complexity; (c) the acquisition rates (*r*) will vary inversely with  $N_R$ ; and (d) the points of inflection will be positively related to  $N_R$ .

**RESULTS:** Empirical plots of probability of correct first choice (*p*) as a function of practice (*N*) for three representative values of  $N_R$  yielded ogival acquisition curves, satisfying the general rational equation:

$$p = i^r N. \quad [1]$$

These curves had an average index of determination of .97. The inflection points for  $N_R = 4, 6$ , and 10 were, respectively, 1.35, 4.55, and 8.18 on the practice dimension.

Difficulty, defined by the median trials (*N*) to the four successive performance criteria (*c*), was a simple logarithmic function of task complexity, defined by the number of possible permutations ( $nPr$ ) in the task. The best fitting rational equation was:

$$N = c \log (nPr), \quad [2]$$

having an average index of determination of .88.

**CONCLUSIONS:** The results are consistent with theoretical expectation and suggest that no qualitative distinction can be drawn between so-called "gradual" and "sudden" problem solutions in human trial-and-error learning under these conditions. (Slides)

**Odoi, Hiroshi.** (*Yerkes Laboratories of Primate Biology*) **The course of oddity learning in monkeys.**

**PROBLEM:** Studies of the oddity problem have typically involved successive reversals and a single pairing of stimulus values on each problem. Since these two conditions of training may obscure certain aspects of the process of oddity learning, an experiment was performed in which three and ten sets of stimuli were used, and in which only one reversal was given.

**SUBJECTS:** Four naive rhesus monkeys.

**PROCEDURE AND RESULTS:** The stimuli were colored plaques varying in color and/or brightness. At each trial four stimuli were presented, one of them being odd and the others being identical. Two series were run successively on all animals.

**Series I.** Three sets of stimuli involving six different colors were presented alternately in successive trials until learned. To determine response to oddity as against response to particular stimulus values, these stimuli were again presented, this time with the colors reversed as to oddity and similarity. All animals showed clear perseveration in terms of the stimulus values.

**Series II.** Each day for four days a critical oddity test series, consisting of 10 new stimulus pairs, was given, together with a series consisting of their reversal. At first all animals responded to a statistically significant degree in terms of the similarity principle, and not in terms of oddity. By the last day, all responded according to the oddity principle.

**CONCLUSION:** The above results indicate that monkeys learn the oddity principle in the following sequence: (a) learning the stimulus values, (b) learning the similarity principle, and (c) learning the oddity principle.

Implications for perceptual and conceptual behavior in monkeys are discussed. (Slides)

**O'Dowd, Donald D., Bruner, Jerome S., & Austin, George A.** (*Harvard University*) **The effect of error on the identification of familiar sequences.**

**PROBLEM:** Will the introduction of an error at different points in a familiar sequential context affect the ease with which the error-bearing sequence is correctly reconstructed by *S*? For example, does an error at the beginning, the middle, or the end of the familiar sequence have differential effects in preventing identification of the sequence?

**SUBJECTS:** 16 undergraduates.

**PROCEDURE:** The familiar sequential contexts used for study were words in the English language: 90 familiar nouns, six to eight letters long. Three forms of each word were prepared containing errors in the first,

middle, or last third of the word. The errors consisted of a transposition of two letters, e.g., anatomy to "naatomy." Three identical 90-word lists were prepared containing equal numbers of errors of each kind in randomized order. Three groups of Ss were assigned to the three lists. Words in a given list were presented to S one at a time for .05 sec. The Ss were instructed to identify the word as quickly as possible.

**RESULTS:** Words with errors appearing at the beginning were harder to identify and required more time than words with errors placed at a later position. An error in the final third of the word was next most difficult. Errors in the middle position presented the least difficulty.

**CONCLUSIONS:** When the beginning of a word is distorted, S is without a context from which to reconstruct the significance of the balance of the word. An error in the middle of the word has but a minor effect, for the cues supplied by the extremities make the middle portion of the word largely redundant. When an error occurs at the end of a word, S is forced to use the middle portion of the word to generate meaning, a portion that is usually treated as redundant.

O'Dowd, Donald D. *see* Matter, Jean

**Oelke, Merritt C.** (*Bucknell University*) **Changes in student teachers' attitudes toward children during initial teaching experiences.**

The purpose of this study was to explore the nature of the changes in attitudes of student teachers during their initial formal teaching experience. The study was limited to those attitudes toward children as evidenced on the Minnesota Teacher Attitude Inventory and on five pictures from Alexander's Thematic Apperception Test for Teachers. The administration and scoring of the latter were modified for group use.

The Ss were 44 senior student teachers teaching in the professional semester at the University of Illinois and 50 juniors enrolled in the University of Illinois teacher training program but not yet student teaching. The seniors were tested with both instruments before and after student teaching, and the juniors were tested and retested with the TAT only, using the same time interval as for the seniors. Data were analyzed by simple analysis of variance, chi square, and the *t* test.

The evidence of this study justified the following conclusions:

1. The teaching and nonteaching groups differed significantly in (a) acceptance of aggression, (b) empathy, and (c) optimism.

2. The Minnesota Teacher Attitude Inventory was more stable than the modified TAT for Teachers and,

apparently, less sensitive to important changes. The two instruments did not measure the same characteristics.

3. There may be an optimum amount and kind of prestudent teaching experience for building favorable attitudes toward children.

4. Further research seems desirable concerning the differences between best and poorest student teachers, particularly as to their attitudes and perceptions of student teaching.

**O'Hare, John J.** (*Medical Research Laboratory, U.S.N. Submarine Base*) **The variability of auditory and visual RT with changes in the amplitude and phase of the alpha rhythm.**

**PROBLEM:** Walsh's experiments on the amplitude and phase of the alpha rhythm at the moment of stimulation did not support the hypothesis that visual RT variability was due to these factors. However, the use of a tuned amplifier by this investigator that attenuated all frequencies other than 10 cps made no allowance for the possibility that the characteristic alpha rhythm might be anywhere between the normal 8-13 cps range. The use of but 6 Ss also makes this point critical.

**SUBJECTS:** 60 enlisted sailors who were highly motivated candidates for submarine school.

**PROCEDURE:** Bipolar occipital recordings were taken with the Grass Model IIIB EEG with a microswitch response key and stimulus signal connected to adjacent EEG pens. In a dark shielded room S heard a 300-msec. preparatory tone signal followed by a variable silent interval of 200 msec.  $\pm$  3 msec., and then a 300-msec. stimulus signal. The two series of visual and auditory signals were provided by a red pilot light of 70 ft.-L photopic brightness and a white noise signal of about 56 db SPL free field.

**RESULTS AND CONCLUSIONS:** Differences in auditory and visual RT do not seem to be due to the amplitude and phase of the alpha rhythm. These data do not lend support to the alpha scanning hypothesis. (Slides)

**Olds, James.** (*McGill University*) **Positive and negative reinforcement by electrical stimulation of various parts of the rat brain.**

Following up studies that have shown positive reinforcement by electrical stimulation of the rat brain, we have implanted electrodes in various parts of the cortex, the rhinencephalon, the thalamus, the tegmentum, and the hypothalamus. To determine the reinforcing value of electrode placement, we have tested animals in Skinner boxes, allowing the rats to stimulate themselves with low-voltage sine-wave currents. The levers are sufficiently large to provide a high operant level so that a zero rate of bar pressing provides evidence of negative reinforcement, yet there

is a vast difference between the operant rate and a reward rate of responding.

Nauta has given a more anatomical analysis of a rhinencephalic system which forms a shell surrounding the thalamus in the rat brain. It includes the hippocampal formation, the cingulate gyrus, the fornix and septum, and tracts through the subthalamus projecting both down to the hypothalamus and up to the thalamus, and extending back into the medial tegmentum. Of the 30 rats that have been tested so far, and on which histology is already complete, we have found that for most electrode placements within this system, or in areas rich in direct connections from this system, the effect of electrical stimulation is rewarding. However, these results vary from a more or less neutral response rate in the hippocampus to an extremely positive rate in the septal area. Negative reinforcement to date has been located mainly in the primary sensory pathways.

With these data we are able to develop a rough map, based on physiological, histological, and behavioral evidence, of the reinforcing effects of electrical stimulation in various parts of the brain. (Slides)

**Olsen, Marjorie A., & Schrader, William B.** (*Educational Testing Service*) **A comparison of item types in the College Board Scholastic Aptitude Test.**

Verbal and mathematical aptitude items may be classified in a variety of ways. This study was designed to compare a number of identifiable item types with respect to their correlations with college grades and with verbal and mathematical scores. It is one of a series of attempts to find out whether the widely used College Board Scholastic Aptitude Test can be improved.

Correlations were obtained for each of 210 verbal items with (a) a total score on verbal items, (b) a total score on mathematical items, and (c) average freshman college grades. A similar set of coefficients was calculated for 76 mathematics items. In all, seven student groups in five colleges were included in the study. With the basic statistical results, it was possible to compare the characteristics of a number of item types. In the main, relatively familiar ways of classifying aptitude test items were used; for example, reading comprehension, completion, and analogies were among the verbal item types studied.

No one type of item showed a clear-cut advantage for predicting grades in all college groups. There was evidence, however, that some kinds of verbal items correlated higher with mathematical scores than did other kinds; differences were also found in the correlations of various types of mathematical items with verbal scores. These findings provide a basis for de-

veloping special tests and for planning a new study aimed specifically at finding out whether the classification of item types developed in this study can contribute to more effective and flexible prediction tests.

**Orbach, Jack.** (*Yerkes Laboratories of Primate Biology and Princeton University*) **Effects of removal of visual cortex on learning and retention in the monkey.** (Sponsor, K. S. Lashley)

**PROBLEM:** To examine the possibility of effects on nonvisual problem-solving ability following ablations of striate cortex in the monkey, and to compare the data obtained with those previously reported for the rat by Lashley and Tsang.

**SUBJECTS:** Four rhesus monkeys, two with bilateral removals of occipital opercula and poles and two with bilateral removals of all occipital tissue caudal to the lunate and parieto-occipital sulci, were used.

**METHOD:** The monkeys were trained preoperatively and tested for retention postoperatively on a large battery of tests including simple somesthetic and auditory discriminations, tests of generalization and transfer, tests of ability to respond differentially according to context, and a somesthetic stylus maze. All tests were run in total darkness with the aid of a snoopscope. To provide a check on the locus and extent of cortical damage, observations were made on residual visual capacities including ocular reactions, residual fields, acuity, depth perception, and orientation in space.

**RESULTS AND CONCLUSIONS:** No marked postoperative deterioration on any of the nonvisual tests by any of the four monkeys was observed. A suggestion of deficit on the delayed alternation in one monkey was not confirmed in any of the other three. The maze habit was retained by all four monkeys. These data provide no indication of nonspecific (nonvisual) functioning of striate cortex in monkeys. The failure to confirm the earlier rat work which indicated marked inability to learn and retain the maze problem following striate cortex lesions is discussed. Discrepancies with the rat data can be attributed to differences in the nature of the tasks used, in the extent of cortical destruction, or in the species studied.

**Osborne, R. T., & Sanders, Wilma B.** (*University of Georgia*) **Age, sex, and other factors associated with Graduate Record Examination performance.**

**PROBLEM:** To investigate the relationship of age, sex, and type and recency of undergraduate training to the profile test scores of the Graduate Record Examination.

**SUBJECTS:** The 1,807 University of Georgia graduate students who were in attendance between February



1946, and February 1952. There were 634 women and 1,173 men. The age range was from 19 to 65 with a mean of 31.76.

**PROCEDURE:** From the files of the Dean of the Graduate School, GRE scores and personal data were secured for all graduate students enrolled between February 1946, and February 1952. Conventional statistical procedures were used to compute confidence levels of mean differences for all seven profiles for students grouped in four-year age intervals. After fractionating by age, analyses were made by sex and recency and type of undergraduate training.

**RESULTS AND CONCLUSIONS:** The data presented would seem to support the hypothesis of a differential rate of decline of acquired knowledge with age for both men and women. The rate of loss with age varies both by sex and subject matter areas.

There is only slight evidence that recency of graduation is related to proficiency on the GRE.

Type of undergraduate degree does not appear to be significantly related to the rate of decline of GRE scores with age. (Slides)

**Osler, Sonia F., & Lewinsohn, Peter M. (Johns Hopkins University) The relation between manifest anxiety and perceptual defense.**

The aims of this experiment were as follows:

1. To conduct a "need in perception" experiment under more controlled conditions than had hitherto been feasible. This was accomplished by a more precise method of matching the stimulus words.
2. To observe the relationship between level of manifest anxiety of *S* and his perceptual response to unacceptable stimuli.

Twenty-six *Ss* participated in this experiment; 10 were in the high-anxiety group and 16 in the low-anxiety group, on the basis of the scores achieved on the Taylor anxiety inventory. The stimuli consisted of 10 pairs of matched words, one of each pair being acceptable and one unacceptable. The words in each pair were matched in familiarity and were identical in structure except for one letter. The following two pairs will serve as examples: (1) tit-tot, (2) bitch-botch. The stimuli were exposed tachistoscopically under constant illumination in random order at varying times of exposure. The exposure time required for the first correct response was considered to be the threshold.

The results were as follows: (a) Within the low-anxiety group there is no difference between thresholds of the acceptable and unacceptable words. (b) Within the high-anxiety group the mean threshold for the unacceptable words is significantly lower than for the acceptable words. (c) There is no difference between the two anxiety groups in the thresholds for

the acceptable words. (d) For the unacceptable words the mean threshold of the high-anxiety group is significantly lower than for the low-anxiety group.

These results run counter to most previous findings of increased thresholds for threatening material. Possible reasons for this will be discussed. These data suggest that anxiety is associated with greater vigilance. (Slides)

**Osterberg, Wesley. (Prudential Insurance Company of America) Handwriting as a success predictor.**

Five studies applying clinical graphology to business were conducted. A total of 157 handwriting samples, from salesmen, clerical, and technical employees, were involved.

**FIRST:** There were 30 handwriting samples from sales agents: 10 top producers, 10 average, and 10 low producers. These cases were mixed, and the graphologist sorted them into 3 success categories on the basis of handwriting analysis.

**SECOND:** The handwriting of 4 high- and 4 low-producing agents was studied. Then a random sample of handwriting of 40 agents was drawn (28 were low and 12 were high producers). The graphologist selected 12 of them as those from the upper group, and 13 as those from the lower group. He was unsure about the remaining 15.

**THIRD:** 17 clerical employees each provided two samples of handwriting. The graphologist was to group them into categories according to intelligence test scores and according to ratings on 5 personality traits. Ratings were by 5 raters, on a 3-point scale. Results were analyzed according to a formula based on the probability function.

**FOURTH:** Handwriting samples from 5 pairs of men were obtained; each pair at opposite extremes on one of 5 personality traits. With these were included 10 others from persons not considered extreme on any of the scales. The graphologist was to identify the extremes for each trait. Results were returned in a form that did not permit a rigorous test of significance, but conclusions could be drawn.

**FIFTH:** Handwriting samples from 25 field men who had had serious account shortages were mixed with samples from 25 who had had long records without shortages. The graphologist separated them again according to his graphological analysis. Two persons untrained in graphology also made "blind" identifications of these cases.

Results of the above studies were presented; the rationale of clinical graphology, its application to industry, and the results obtained in these studies were discussed.

**Palermo, David S. see Castaneda, Alfred**

**Parker, Thomas E. (Pepperdine College) An investigation of the concepts ego involvement and psychological stress.**

Conditions used to produce ego involvement and psychological stress in psychological experiments are frequently identical. This study investigates whether or not the concepts, here defined separately and exclusively, are associated with separate effects on behavior.

Eighty students, divided into four equal groups labeled ego-involved stress, ego-involved nonstress, non-ego-involved stress, and non-ego-involved nonstress, served as Ss.

Twenty paper-and-pencil tasks were given each S individually. Ten were interrupted. It was emphasized that interruption did not constitute failure. Three recalls were taken; immediate, one day, and one week. If a task was named or described, it was scored as recalled. An analysis of variance was used with a factorial design. Systematic account was taken of the correlation introduced by the repeated measures on the same Ss.

The ego-involved condition was created by telling Ss they were taking a test. The stress condition was a mild electric shock administered during each task. The absence of these conditions created non-ego-involvement and nonstress conditions.

Ego involvement was associated with a higher level of recall of interrupted tasks and an increase in the level over the one-week period. Stress alone was not associated with any significant effects. When Ss were both under stress and ego-involved, the level of recall was higher than with ego involvement alone and the increase noted with ego involvement was significantly higher.

Unless ego-relevant, stress was not associated with any significant differences of the aspects of behavior measured here. The concepts were associated with different changes in behavior and therefore it seems useful to retain them in the literature. The finding that behavior is not affected by stress unless it is ego-relevant has widespread implications for studies in stress and merits further research.

**Pasto, Tarmo A. (Sacramento State College) The schizoid bias in art: derivation and meaning.**

**PROBLEM:** If we assume that art expressions are strongly colored by an unconscious attempt to project the body image, it may be expected that the art of the regressed schizophrenic would be strongly flavored by a conflict between mental control and body expression and/or awareness. Such a study might provide additional insight into the nature of modern art and the art of the primitive native both of whom

may be said to have attempted to examine and state their relationship to the world about them by means of an expression that explores the psychic contents of the body.

**SUBJECT:** The S used in this study is a tubercular regressed noncommunicative schizophrenic with paranoid trends. He is a 69-year-old Mexican who has been institutionalized for the past 23 years. He has been a prolific artist for the past six years producing drawings at the rate of three to five a week. Done on wrapping paper and glued-together scraps of paper salvaged from the ward wastebaskets, the drawings vary in size from 12 feet to a few inches. He sketches meticulously with colored pencils, prefers the cooler greens and blues, and reiterates certain type forms relating to his native culture and revolving around a matrix of masculine-feminine conflicts.

**METHOD:** The study consisted of collecting S's work over the period of years, cataloguing type forms, noting progressive changes, and closely observing him at work at his drawings on the ward. Though friendly and receptive he is noncommunicative, and no attempt was made to influence his productions other than to keep him supplied with materials.

**RESULTS AND CONCLUSIONS:** Over 100 artistic productions were collected and mounted. The work shows both structured and unstructured forms, with the unstructured forms varying from acutely disturbed uncontrolled ramblings to some attempt at abstract design. The body image appears as a tiny inadequate figure overwhelmed by the archetypal images which appear in profusion. Condensations in the form of composite images appear standing in symbolic relationship to unconscious conflicts, perhaps an attempt to "explain away" a mysterious underground force by objective manipulation of the symbol. In this form the evidences of concretistic, archaic, and primitive thought appear, often woven into a religious context. Simplifications, distortions, and omissions are frequent. Occasionally the body image becomes spatial and crystallized to appear later distorted in proportion, hostile and aggressive, and loaded with phallic weapons.

One is led to the conclusion that the "pure" abstracted forms of the regressed schizophrenic are loaded with meaning and emotional content arising from unconscious conflicts. The retreat to primitive gestalt configurations may lead to better understanding of the modern abstract abstractionist painter whose forms bear some superficial relationship to the forms of the schizophrene and whose motivations may be very similar to both the primitive and the psychotic. Similarities were noted in the handling of and preoccupation with problems of time and space, in the "timeless" quality of human forms, and in idea-

tion. The modern artist and the modern schizophrenic are, after all, products of the same culture. They vary in their expressions mainly in degree of conscious control.

**Pastore, Nicholas.** (*Queens College*) **Discrimination learning in canaries.**

**PROBLEM:** To study two predictions that are implied by a perceptual interpretation of results from certain discrimination learning experiments. (a) In relation to the oddity problem there should be a progressive transfer as different stimulus combinations are presented. (b) With identical stimulus objects only, animals should learn to respond to a grouping factor. In addition, there should be transfer to different sets of objects.

**SUBJECTS:** 4 canaries participated in both experiments; Exp. II followed I.

**PROCEDURE:** For Exp. I, 8 identical objects and one odd object covered food wells with reinforcement always associated with the odd object. The birds had to learn to push away the odd object and obtain grain in the well below. Stimulus values were reversed from trial to trial. After mastery of a given stimulus combination to the criterion of at least 15 hits in a series of 20 trials, another stimulus combination was presented. There were 21 different stimulus combinations all told. The order of presentation of the stimulus combinations was different for each bird.

For Exp. II, 3 objects were placed at one end of the food tray and a single object was placed at the other end (all objects were identical). Reinforcement was always associated with the isolated stimulus. After the birds learned to select the isolated stimulus to a criterion of at least 15 hits in 20 trials, additional stimulus objects were presented.

**RESULTS:** In Exp. I, all 4 birds significantly demonstrated transfer. In Exp. II, all 4 birds learned to select the isolated stimulus and showed transfer to new stimulus objects.

**CONCLUSION:** Two predictions based on a perceptual interpretation of discrimination learning were experimentally confirmed.

**Payne, M. C., Jr., & Kappauf, W.** (*University of Illinois*) **Response dependencies in brightness matching data.**

**PROBLEM:** To study dependencies between responses in a brightness matching situation, and to assess the influence of several variables on these dependencies.

**SUBJECTS:** Six male students.

**APPARATUS:** Two small homogeneous rectangular fields, one standard and one variable in brightness, presented in a large glare-free surround. Separation of the test fields could be set at 0.25", 2", or 16". A

timer delivered pacing signals at rates of one signal every 7.5 or every 15 sec.

**PROCEDURE:** S adjusted the brightness of the variable to agree with that of the standard. He was instructed to complete each match in time with the pacing signal. The experimental design was latin square with respect to test orders by S. The E recorded each brightness setting of the variable.

**ANALYSIS:** Pearson  $r$ 's were computed for lags 1 through 30 for each S and each condition.

**RESULTS:** At lag 1, all 36 of the observed correlations were positive; 27 were significantly different from zero. An analysis of variance of the transformed  $r$ 's ( $z'$ ) at lag 1 showed that the differences between Ss were the only differences that reached statistical significance. The number of successive lags through which significant correlations persisted was also different for Ss but not for experimental conditions (nonparametric test). The effect of response pacing, although not statistically significant, was in the expected direction, namely, less dependency between successive responses at the slower pace.

The curves showing correlation as a function of lag decline in a generally negatively accelerated way. On the average, the correlations were significantly different from zero through the first four lags.

**CONCLUSIONS:** Response dependencies in brightness matching by the method of reproduction are real. Their extent and duration vary from subject to subject. They did not vary significantly with response pacing or field separation within the limits studied. (Slides)

**Payne, R. B.** *see* Hauty, G. T.

**Pelz, Donald C.** *see* Mellinger, Glen

**Perkins, M. J., Banks, H. P., & Calvin, Allen D.** (*Michigan State College*) **The effect of delay on simultaneous and successive discrimination in children.** (Sponsor, Allen D. Calvin)

**PROBLEM:** The present experiment had the following purposes: (a) to determine the relative difficulty of simultaneous and successive presentation of stimuli in children; (b) to investigate the effect of delay on simultaneous and successive presentations.

**SUBJECTS:** 56 children from the third and fourth grades of a local school.

**PROCEDURE:** Two identical cups were placed on a wooden stand. A white and a black served as cues. If S chose the cup behind the positive cue, he was given a toy. The stand was equipped with a screen which could be dropped by E so that S was unable to see the cues. The Ss were divided into four groups of 14. Group I was presented with a standard discrimination problem with both positive and negative



cues present on each trial. Group II was a replication of Group I except that S was allowed to look at the stimuli for 5 sec., a panel was then dropped for 5 sec. and the stimuli removed. After this delay period, the panel was raised, and S made a choice. Group III was presented only a single cue and had to make a spatial response on that basis. The procedure for Group IV was the same as that of Group III except that a delay procedure similar to that used for Group II was utilized. A balanced experimental design was used in all groups, and criterion for solution was ten successive errorless trials.

**RESULTS:** The simultaneous groups were significantly superior to the successive under both conditions, and although delay made both problems more difficult, the difference between delay and nondelay fell short of significance.

**CONCLUSIONS:** The superior performance of the simultaneous groups supports Spence's position. Lack of a differential effect in favor of the successive group under conditions of delay is discussed.

Perry, Daniel J. *see* Mount, George E.

Peryam, David R. *see* Pilgrim, Francis J.

Pfaffmann, Carl, *see* Hagstrom, Earl C.

Phillips, Beeman N. (*Indiana University and Indiana State Department of Public Instruction*)  
**Relationship of process behavior to the task efficiency of small face-to-face groups.**

In this study the relationship of the process behavior of a small face-to-face group to its efficiency on a problem-solving task was investigated. Subjects were 24 five-member groups of third graders. Verbal and nonverbal communications were recorded in one of 12 process behavior categories. These categories were developed and checked for interobserver reliability in preliminary testing. The task was a modified version of "Twenty Questions." The animals used were selected from third grade readers. The number of questions required to name ten animals correctly was the criterion of task efficiency. A significant relationship was found between the task efficiency and the amount of task-oriented communication of a group. A highly efficient group showed significantly more interest in discussing the task than did a less efficient group. There also seemed to be a positive relationship between the number of attempts to raise the status of others and the efficiency of a group, and a negative relationship between the number of attempts to lower the status of others and the efficiency of a group. It was concluded that the process behavior of a small face-to-face group is related to its efficiency on problem-solving tasks.

Pilgrim, Francis J., Schutz, Howard G., & Peryam, David R. (*Quartermaster Food and Container Institute for the Armed Forces, Chicago*)  
**Influence of monosodium glutamate on taste perception.**

**PROBLEM:** To test the hypothesis that monosodium glutamate (MSG) affects flavor perception by increasing gustatory acuity.

**PROCEDURE:** Three types of measurements were used to assess the effects of MSG: changes in absolute thresholds, changes in differential thresholds, and changes in subjective intensities. In the threshold tests Ss rinsed either with an MSG solution or with water prior to each sample. The Ss (5-18 per test) were experienced in threshold testing. Measures of relative subjective intensities were based on the judgments of untrained consumer-observers (30-48 per test) who compared solutions of the primary taste qualities with and without the addition of MSG.

**RESULTS:** An MSG rinse before each sample had no effect on the absolute threshold for sugar and increased that for sour; it did not significantly alter the differential thresholds for salt and bitter. The presence of MSG in solutions of the basic tastes increased the subjective intensities of salt and bitter, had no effect on sour, and slightly decreased sweetness. No consistent pattern of the effect of MSG emerged. The results do not support the hypothesis that MSG acts as a general intensifier of flavors and suggest no other hypothesis, except the general one that MSG is simply another seasoning that may contribute a flavor of its own to a complex food flavor. The effect of MSG on preference for foods with deteriorated flavors is also discussed in relation to these findings. (Slides)

Pirojnikoff, Leo *see* Ax, Albert F.

Polansky, Norman A. *see* Kounin, Jacob S.

Polemis, Bernice W. *see* Schutz, Howard G.

Pollack, Max. (*Department of Neurology, Mount Sinai Hospital*)  
**Problem-solving behavior in patients with brain tumors.**

**PROBLEM:** Several studies of the effect of brain tumor on intellectual functioning have reported maximal impairment after frontal lobe involvement. By contrast, penetrating missile wounds of the frontal region have been found to disrupt intellectual performance no more than similar lesions of the posterior brain substance. The purpose of this study was to evaluate the relative effects of anterior versus posterior expanding cerebral lesions on problem-solving tasks similar to those employed in the study of penetrating gun shot wounds.

**SUBJECTS:** 57 hospital patients with verified localized space-occupying lesions of the cerebrum. These

included (a) 18 precentral (frontal and frontotemporal), (b) 21 postcentral (parietal, temporal, occipital), (c) 17 intermediate (i.e., lesions involving pre- and postcentral regions). Twenty-nine hospital patients with infratentorial CNS lesions served as controls.

**METHOD:** Four problem-solving situations were used: modifications of Maier's candle blowing and string problems and Duncker's picture frame and candle holder problems. Two tasks were given preoperatively and the other two postoperatively. A series of "hints" was given at predetermined intervals to aid solution of each problem. Success and failure and time to solution were recorded as were detailed notes of the S's behavior.

**RESULTS:** Of the four problems used only the candle blowing (Maier) and candle holder (Duncker) distinguished between tumor cases and controls. The experiments required significantly more time to solve these problems than the controls. No significant differences between anterior and posterior groups appeared on any of the tasks despite the fact that anatomically demonstrable bilateral involvement was present in 40% of the frontal cases and was absent in the posterior cases. The results with these tumor cases thus parallel those reported for men with penetrating missile wounds of the brain. (Slides)

Pollack, Max *see* Battersby, W. S.

Pownall, Jo E. *see* Cottle, William C.

Preston, Malcolm G. *see* Mitchell, Howard E.

Pribram, Karl H., & Mishkin, Mortimer. (*Institute of Living*) **Analysis of the effects of frontal lobe damage in monkeys: II. Non-spatial alternation.**

**PROBLEM:** The first portion of this study demonstrated that following frontal lobe damage, monkeys performed well on some variations of delayed response and failed on others. Successful performance occurred when nonspatial predelay cues were employed. The aim of the present investigation was to determine whether the effects of nonspatial predelay cues differ from those of spatial cues in an alternation task.

**SUBJECTS:** Eight rhesus monkeys, four with bilateral anterofrontal, four with bilateral inferotemporal lobe damage, the latter serving as controls.

**PROCEDURE:** All animals received 1,000 trials of non-spatial, followed by 1,000 trials of spatial alternation. For each trial of nonspatial alternation the S displaced one of two dissimilar objects placed 18 in. apart. Correct performance, rewarded by peanut in "food-well" below object, consisted of displacing that object which

had not been displaced on the previous trial. The place of the objects was changed in random order. For each trial of spatial alternation the animal displaced one of two identical plaques 18 in. apart; correct performance, rewarded by peanut in "food-well," consisted of choosing the plaque in the place not chosen on the last trial. In both tests, trials were separated by the interposition of an opaque screen for 5 sec., and correction technique was used.

**RESULTS:** Performance was scored in blocks of 100 trials. Frontal operates performed worse than controls on both procedures with no overlap after the first 500 trials. Whereas controls performed better on the spatial task than on the nonspatial, frontal operates attained essentially similar scores on both. The latter result was confirmed by subsequent removal of anterofrontal cortex in the temporal operates.

**CONCLUSIONS:** These data indicate that frontal operates are impaired with respect to performance based on nonspatial as well as spatial predelay cues. Thus the discontinuity in the relative effectiveness of non-spatial vs. spatial predelay cues, suggested by the previous study, is not confirmed. (Slides)

Primoff, Ernest S. (*Test Development Section, U. S. Civil Service Commission*) **Use of the J coefficient to set up merit-system examining of the blind in trade jobs.**

For merit-system examining of the blind, test scores must place blind persons in proper relative position on the same register with the sighted, in accordance with ability to do a job. Civil Service tests for the sighted were converted for the blind by using a special printing process at the Government Printing Office. J-coefficient studies to determine the validities of the tests for blind and sighted workers were conducted in Baltimore, New York, St. Louis, Denver, San Francisco, and Los Angeles, involving about 1,000 workers. Central and regional Civil Service offices participated. Vocational Rehabilitation and other agencies serving the blind in the States were helpful in locating subjects.

For some jobs, the same battery was valid for blind and sighted. Usually, some tests differed. For example, for certain processors, arithmetic, oral directions, alinement dexterity, and number checking were the valid tests for the sighted, but the blind required in addition tests of memory, form perception, and pattern matching. In some jobs, a test of following oral directions was valid for sighted but not blind. This may reflect supervisory disinclination to give unusual tasks to blind workers. In some instances, following directions was more valid for the blind. When different tests are used for blind and sighted, standards are

set through equalized norms, based on scores of workers with equal criterion ratings.

Prince, Albert L. *see* Hammock, Joseph C.

Raifman, Irving. (*National Naval Medical Center, U. S. Naval Hospital, Bethesda, Maryland*) **Personality factors of dependency and overcompensatory goal-striving behavior in peptic ulcer patients.**

**PROBLEM:** Alexander *et al.* have described the peptic ulcer personality as having a conflict over unacceptable dependency wishes. They feel that the ulcer patient fights internally against the expression of these wishes, denying these needs on the surface by presenting a facade of goal-striving and self-assertive activity. Three hypotheses, based directly on the theoretical conflict situation were formulated:

1. Peptic ulcer patients express significantly more dependency needs than do normal and psychoneurotic patients.

2. The dependency needs of the peptic ulcer patients are significantly less acceptable to the personality than the dependency needs of normal and psychoneurotic patients.

3. Peptic ulcer patients substitute a facade of overcompensatory goal-striving activity to mask their feelings of dependency, whereas the control groups do not show this defensive mechanism.

**SUBJECTS:** 45 white, male, veteran patients of Kingsbridge VA Hospital, Bronx, New York, between the ages of 22 through 45. There were three groups of patients; 15 diagnosed as peptic ulcer, 15 diagnosed as psychoneurotic (with no psychosomatic illness), and a like number of patients with minor surgical problems selected as normal on the basis of their performance on the Cornell Selectee Index.

**PROCEDURE:** The Rorschach, Thematic Apperception Test (14 selected cards), and the Rotter Level of Aspiration Test were administered to each S. After analyzing each protocol, two clinicians rated each S according to a check list devised by the author. Appropriate statistics were applied to their ratings. The Rotter Level of Aspiration Test and the Rorschach test were then analyzed quantitatively for appropriate distinguishing features.

**CONCLUSIONS:** Dependency emerged as a strongly positive personality feature in all three groups, with no group showing any greater tendency toward acceptance of dependent needs than any other. However, ulcer patients showed overcompensatory needs and striving activity in reaction to their unacceptable dependency needs which differentiated them significantly from the normal and psychoneurotic groups.

Ramond, Charles K., Carlton, Peter, & McAllister, W. R. (*State University of Iowa*) **Feeding method, body-weight change, and performance in instrumental learning.**

Hunger drive in rats has been defined as number of hours since a feeding period. During this feeding period, however, some experimenters have given each rat a limited amount of food to eat, while other experimenters have allowed each rat to eat as much as it could in a limited time. The purpose of the present study was to investigate the effect of these different feeding methods, continued over many days, upon (a) changes in body weight, and (b) postchange running speed (reciprocal of latency) in a simple instrumental learning situation.

Seven male and nine female hooded rats were administered the "limited amount" (LA) procedure; each was given eight grams of dry mash daily. Eight male and eight female hooded rats were placed on the "limited time" (LT) regimen; each was allowed to eat all it could during a daily 50-min. period. The following measures were obtained daily for 37 days from each S: (a) body weight immediately prior to feeding; (b) amount of food eaten; and (c) amount of water drunk during the feeding session. Between days 30-37, each rat received 72 speed trials in a modified Skinner box. Each trial was reinforced after 1 sec. by automatic presentation of an .07-gm. pellet of dry mash.

Compared for days 30-37 on the basis of percentage of original (day 1) body weight lost, the LA groups lost significantly more than did the corresponding LT groups; males lost significantly more than females; and there was a significant interaction between feeding method and sex.

LA males ran significantly faster than LT males. LT females ran significantly faster than LT males, but LA males ran significantly faster than LA females.

Of the LT Ss, males ate significantly more than females, and there was a significant positive correlation (.64) between amounts of food eaten and water drunk. (Slides)

Rautman, Arthur L. (*VA Mental Hygiene Clinic, Passe-a-Grille, Florida*) **Children's reactions to their own anxieties.**

**PROBLEM:** Because of limited experience, children operate under the double handicap of being unable to comprehend the true significance of events and of having their emotional reactions to events intensified by lack of perspective. The violence of their responses necessitates efforts at adjustment, thus affording insight into their basic security. From this viewpoint, this paper reports an attempt to determine how chil-



dren react to their own anxieties. Answers were sought to the questions:

What are the common affect-laden themes in children's thinking, as revealed by their TAT productions?

Do children view seemingly distressing themes as dysphoric and threatening, as neutral, or as basically happy and cheerful?

To what extent do children endow distressful situations with happy outcomes, and to what extent do they reveal a fundamentally pessimistic attitude by giving happy or neutral themes disastrous or sad endings?

**SUBJECTS:** The data are based upon 4,680 TAT themes secured from 468 public school pupils in grades three through six.

**PROCEDURE:** Ten pictures from the TAT were presented in classroom situations. The pupils were asked to write a brief story about each, including answers to three questions: (a) What is happening? (b) How are they feeling? (c) How will it end?

Each story was analyzed, and 18 common dysphoric main themes were studied. Outcomes were tabulated as Happy, Neutral, or Sad; and shifts in mood were noted.

**RESULTS AND CONCLUSIONS:** A basically happy mood is demonstrated by the fact that only 14.6% of the themes had Sad endings, as compared with 50.6% having Happy endings. As an index of children's resilience, only 5.9% of the themes changed from Happy to Sad, whereas 43.8% of the Sad themes were endowed with Happy outcomes.

This method of investigating children's basic optimism and pessimism seems to warrant further study as a possible screening technique for identifying children in need of special psychological help.

**Ray, Wilbert S.** (*Air Force Personnel and Training Research Center*) **Massed and distributed work in problem solving.**

**PROBLEM:** Research on the effects of massed and distributed work in problem solving is one step in investigating the extent to which the phenomena found in more traditional learning situations extend into the field of thinking and reasoning.

Interpolated periods can be inserted into problem-solving activity according to any of three paradigms: during the solution of a problem, after each of repeated solutions, or after each of a series of similar problems. The present experiment used the first of these paradigms. It will be noted that the second paradigm is indistinguishable from a "more traditional" learning experiment.

**METHOD:** *S* was asked to discover how to win a game in which 11 objects are laid on a table, each of the

two players (*E* and *S*) takes alternately one or two objects from the pile, and *S* plays first and wins if he takes the last object—a situation in which partial solutions typically precede the final complete solution. The *E* won if *S* made an error at any stage of the problem.

Six groups, each containing 32 basic airmen at Lackland Air Force Base, worked to a criterion of four successive games won, with an interval filled with cancelling letters inserted after each second game. The intervals were 0, .5, 1, 2, 4, and 8 min. long.

**RESULTS AND CONCLUSIONS:** With this task, this paradigm, these intervals, and this interpolated material, the ease of solving the problem seems to be a monotonic increasing function of the length of the interpolated interval. Trend analyses provide a .01 or a .02 confidence level, depending on the analysis used. This is contrary to the results of the three previous experiments in this field, all of which found massed work to be more efficient than distributed work in problem solving. (Slides)

**Radio, Joel** *see* Jessor, Richard

**Reglein, Ned L.** (*Indiana University*) **Some needed research in psychological problems in educational television.**

That there are numerous problems in connection with television broadcasting, and particularly educational TV, everyone understands. Commercial radio broadcasters and telecasters have instituted some research, usually slanted to produce the results they desire, but educational television is so new that little has been done to investigate its psychological implications.

The writer therefore proposes that the following problems be looked into in connection with the telecasting of educational programs:

1. Perception: what is the proper object size; what should be the length of printed titles; what should be the size of captions; color is more effective than black and white TV.

2. Retention: how long do people remember what they see on educational television programs? What is the value of repetition in educational programs in content? Should programs be repeated several times in toto?

3. What is the real value of programs such as Ding-Dong School? Are such programs really helpful to children and parents?

4. In terms of learning, the development of skills, and the development of attitudes and appreciation, can television be an effective instrument?

5. How much concomitant learning is there in viewing entertainment television programs?

6. In what way is behavior pattern influenced by viewing by preadolescents and adolescents with respect to educational television programs?

7. Do programs involving teaching, cooking, and sewing train or amuse?

**Reid, Jackson B., Melching, William H.** (*Radio-biological Laboratory, University of Texas*), & **Kaplan, Sylvan J.** (*USAF School of Aviation Medicine, Randolph AFB*) **An investigation of some behavioral mechanisms involved in transfer.**

**PROBLEM:** An experiment was undertaken to investigate the roles of "concept formation" and "learning set" in transfer of training under shock motivation.

**SUBJECTS:** 32 male *Macaca rhesus* monkeys.

**PROCEDURE:** In Phase I, Ss were required to learn 12 visual discriminations, each involving a single pair of stimulus blocks. The objects were so constructed that all positive blocks possessed certain features ("gestalt characteristics") in common, while the negative blocks possessed other features in common. Each S was trained on each pair of blocks to a criterion of mastery. After mastery was demonstrated on all pairs, an overlearning period followed in which the 12 pairs were presented in serial order.

In Phase II, 18 of the animals from Phase I were trained on new stimulus pairs. The Phase I positive-negative relationship was maintained for Group P-N, but reversed for Group N-P. Group P-P was trained on a pair in which both members possessed features in common with formerly positive blocks, and Group N-N was trained on a pair in which both members possessed features in common with formerly negative blocks.

**RESULTS:** Monkeys transferred to a series of new discriminations providing they had had two or more experiences mastering tasks involving similar but not identical stimulus pairs. When novel pairs were introduced, transfer effects were (a) positive for Group P-N Ss, (b) negative for Group N-P Ss, and (c) not apparent for Groups P-P and N-N.

**CONCLUSIONS:** The findings were interpreted as indicating the operation of concept formation; learning set alone was considered inadequate to account for the transfer effects. Results also suggested that relational learning, rather than stimulus generalization, was operative in the situation. Further, the evidence suggested that some investigators may have failed to reveal concept formation, because Ss were not afforded an opportunity for "hypothesis verification." (Slides)

**Reid, John W.** (*VA Regional Office, Syracuse, New York*) **The influence of teaching method in a psychology course of general education nature.**

**PROBLEM:** What differences in outcomes arise when a course is taught in a certain way? If measures of outcome beside textbook tests are used, what are the results of lecturing, of using "democratic-participative" discussion techniques, or of stressing how to read psychology and vocabulary development?

**SUBJECTS:** Three comparable college sections. Section B had 25 freshmen, 14 sophomores, and 3 juniors. The N of Section B was 42. Twenty-three were females.

Section C had 21 freshmen, 16 sophomores, and 3 juniors. The N of Section C was 40. Sixteen were females.

Section D had 37 freshmen, 2 sophomores, and 1 senior. The N of Section D was 40. Seventeen were females. Freshmen were new entrants in a state college in a rural area.

**PROCEDURE:** All sections were given two pretests that were repeated as posttests. One was a General Information Test devised by Buxton; it has 100 true-false items measuring false beliefs and misconceptions concerning psychology. The other was an Opinion Survey purporting to measure "democratic attitudes and readiness to engage in democratic, collaborative relations with others"; it has 92 items including some from the F scale of the researchers on antidemocratic personality. Degree of intensity of opinions score 1 to 5.

One instructor taught all 3 sections. He gave authoritative answers to Section B. In Section C a permissive "student-centered" approach prevailed. Sections C and D each formed four "student groups" of both sexes. These student groups conducted discussions independently of the teacher on four case studies. Section D received more coaching on reading and vocabulary than did the other sections; Section D had almost all freshmen.

Six examinations on the text, plus two examinations requiring students to write or solve case-study problems, besides the posttests, form the basis of comparison.

**RESULTS AND CONCLUSIONS:** Analysis of teacher's anecdotal daily record, tape-recordings, and student responses to check lists indicates some success in fostering the "atmospheres" proposed. No statistically significant differences in achievement on course-content tests among the sections appear. By mid-term there appear no differences in ability to write case analyses. By end of term some differences on posttests do appear.

**Reitan, Ralph M.** (*Indiana University School of Medicine*) **A quantitative study of intellectual functions in multiple sclerosis.**

**PROBLEM:** Estimates of the frequency of intellectual impairment in multiple sclerosis range from 2 to 50%. Baldwin, Canter, and others have shown that measurable impairment may occur in some patients. However, Diers and Brown recently concluded that the Wechsler-Bellevue scale shows no impairment.

**SUBJECTS:** 13 patients with multiple sclerosis were individually matched with patients having proven brain damage and patients with neurosis but no brain damage on sex, color, age, education, and Full Scale Wechsler-Bellevue IQ.

**PROCEDURE:** The Minnesota Multiphasic Personality Inventory, Halstead's tests of biological intelligence, and the Rorschach test were individually administered to each patient over a 1½ to 2-day period. Statistical intergroup comparisons were made.

**RESULTS:** The MMPI showed strikingly similar mean profiles in the 3 groups, the "neurotic triad" of Hypochondriasis, Depression, and Hysteria being elevated. On Halstead's tests of biological intelligence, none of the mean differences in the groups with multiple sclerosis and brain damage was significant. The Halstead Impairment Index differentiated these 2 groups from that without brain damage at a probability beyond .0002. Most of the individual tests composing the Impairment Index also showed significant differences in the groups with multiple sclerosis and brain damage as compared with the controls. The Rorschach showed differences in the same direction as Halstead's tests, but they were not as large with relation to their variability.

**CONCLUSIONS:** Halstead's tests of biological intelligence and the Rorschach test indicate that impaired intelligence in multiple sclerosis is very similar both in kind and degree to that in comparable patients with brain damage. This study also represents the first independent report on the validity of Halstead's battery. Our results offer general substantiation of his findings. The tests of biological intelligence were by far the most sensitive to the effects of brain damage among those used. (Slides)

**Rethlingshafer, D., & Hinckley, E. D.** (*University of Florida*) **Influence of characteristics of judges on their psychophysical judgments.**

The problem was to predict adaptation level for a series of judgments of ages (or heights) by assuming that judge's own age (or height) was "background" upon which the series of stimuli was evaluated.

Helson's equation,  $AL = K(A \cdot \bar{A})^{\frac{1}{2}}$ , developed in studying  $AL$ 's of brightness stimuli with varying

background, was modified by assuming that stimuli judged (age or height) were equivalent to brightness series, and judge's age (or height) was equivalent to background luminance. Six groups, total 480 Ss, rated ages on nine-point scale from young to old. The average age of each of three groups of judges rating men's ages were 9.7, 23.4, and 77.0 years. The ages of female judges, evaluating ages of women, were 10.1, 18.9, and 71.0 years. The ages judged ranged from 6 to 108 years. Similarly, judgments were made of heights of men from 4 ft. 8 in. to 6 ft. 11 in. by two groups of 260 short and tall males.

By the use of the log form of Helson's equation above, and substitution of appropriate constants,  $AL$ 's were predicted that were very close to obtained values. This closeness of prediction (a) supports the assumption that "personality" characteristic of a judge is a part of the background of his judgment; (b) further supports Helson's assumptions in regard to concept of  $AL$ ; and (c) demonstrates that an equation developed in an analysis of data concerning brightness judgments can be used with judgments of ages, or heights, when background luminance is assumed to be equivalent to a characteristic of a judge.

Acknowledgment for collection of data is made to W. D. Bliss, Jr., C. H. Maag, and G. Rettie, Jr. (Slides)

**Rigby, Marilyn K.** *see* Wilkins, Walter L.

**Rigney, Joseph W., & Bryan, Glenn L.** (*University of Southern California*) **Special problems in the construction of electronics trouble shooting tests.** (Sponsor, Glenn L. Bryan)

The development of measures of electronics trouble shooting behavior is examined in terms of the unique problems that this behavior poses. A comparison is made to problem-solving behavior, particularly in regard to the paucity of observable referents for the process and its time-consuming nature.

Scoring procedures are discussed in terms of two general viewpoints concerning just what it is that should be scored. One point of view emphasizes the totality of the trouble shooting process and favors end-product scores of success or failure in repairing the trouble. A second approach stresses the successive dependence of the moves (responses) the subject makes, and it derives scoring parameters from pre-solution behavior analysis.

Practical problems are discussed such as the time or duration of a single trouble shooting process, the difficulty of fault simulation, and the wide variation in electronics equipment and circuitry. Particular attention is paid to the extensiveness and heterogeneity of the population of "faults" which might be used as test "items," and to the types of information which



are needed concerning the psychometric properties of different "faults." Similarly, if electronic equipment is used as the test vehicle, cognizance must be given to the facts that in many systems output functions change with time, even though the equipment is left alone; simulation of faults in equipment may alter subsequent performance of the equipment; and each subject's operations may significantly affect later equipment functioning.

The last problems discussed concern differences in subject populations, the difficulty in generalizing from one subpopulation to another, and sampling difficulties within a rapidly changing situation.

**Riopelle, Arthur J. (Emory University) Preferences, rewards, and learning sets.**

This experiment attempts to assess the relative significance of real and surrogate rewards as indicators of the correct stimulus in a two-choice simultaneous discrimination learning situation. These two factors are here independently combined with the preference for the correct or incorrect stimulus. Performance is traced throughout a series of 250 six-trial object-quality discrimination problems.

Twenty-four naive, adolescent rhesus monkeys participated in the experiment. All were tamed and trained to displace a single test object to secure food reward prior to this experiment. Ten problems were administered each day. All testing was performed in a modified version of the Wisconsin General Test Apparatus using the noncorrection procedure throughout.

The animals were distributed at random to eight independent groups. These groups were differentiated by the particular preference-reward procedures applicable on trial 1 of each problem for that group. These groups were Food +, Food -, Marble +, Marble -, Food and Marble +, Food and Marble -, No Food +, No Food -. The correctness of the stimulus was indicated by the presence (or absence) of food, a marble, or both. The plus and minus signs refer to the "correctness" of the choice on trial 1, i.e., the object chosen on trial 1 is rewarded if selected again on trials 2 through 6. Procedures on trials 2 through 6 were identical for all animals: food reward for correct choice, no food for incorrect choice. The experiment is thus describable as a 2<sup>8</sup> factorial design.

Analysis of results for trial 2 and for trial 6 revealed highly significant differences among groups and among slopes of the curves. Inspection of the data revealed the persistent importance of the role of stimulus preferences in the determination of discrimination test performance. Food reward was found not to be superior to marble as an indicator of the correct object.

Subsequent to this phase of the investigation, these animals were tested on 50 discrimination learning set problems involving object-quality discrimination. Again significant differences among groups were revealed, thus indicating that not all groups had formed efficient learning sets.

**Riss, Walter. (University of Kansas) Sex drive and energy output in four genetically different stocks of male guinea pigs.**

Previous studies have indicated that various stocks of male guinea pigs differ reliably in the rate of development and in the intensity of sexual behavior. It was thought desirable to determine whether these stocks differed in physiological measures of energy output and, if so, whether such differences were related to the intensity of mating behavior.

Seven Strain 2, 8 Strain 13, 7 stock T, and 7 males from an inbred line being developed from stock L were reared individually with 2 females their own age from day 25 (weaning age) to day 90. Twenty consecutive daily tests with estrous females were begun day 90. The number of mounts, intromissions, and ejaculations in 20 tests were taken as indices of sex drive. The rate of oxygen consumption was obtained from each animal at ages 1, 2, 4, 6, 8, 12, and 16 weeks. Heart rates were measured at the same ages with the exception of the first week.

Stock T males were highest, Strain 2 next, and both Strain 13 and inbred line L lowest in indices of sex drive and oxygen consumption. These indices were significantly correlated with oxygen consumption. Heart rate was found not to be correlated with sexual performance. Strain 2 and 13 males were low in heart rate but stock T and inbred line L were high.

It was concluded that physiological variables, presumably genetically influenced, limit the energy output available for the sustained pursuit culminating in ejaculation which is necessary in order to achieve a high behavioral rating. In agreement with such a hypothesis was the striking finding that no animal with a low level of oxygen consumption achieved a high number of these measures of sex drive.

Aided by grant M-504(c) from the U. S. Public Health Service. (Slides)

**Ritchie, M. L., & Muckler, F. A. (Aviation Psychology Laboratory, University of Illinois) Retroaction as a function of discrimination and motor variables. (Sponsor, M. L. Ritchie)**

**PROBLEM:** In psychomotor retroaction studies, the results obtained using different experimental apparatuses have frequently led to contradictory conclusions. A key to apparatus variables may result from obtaining different retroaction functions from changes in discrimination and motor stages in a given task.

**SUBJECTS:** 180 basic airmen trainees at Chanute AFB.  
**PROCEDURE:** The experimental task required that *S* learn to respond with four switches in the same sequence as four previously presented stimulus colored lights. In a retroaction design, three variables were investigated: (a) variations in the nature of the interpolated tasks, (b) variations in amount of original learning, and (c) variations in amount of interpolated learning. Two types of interpolated tasks were used: the "discrimination" interpolated task consisted of changing stimulus-response relations; the "motor" interpolated task required changing the movements necessary to actuate the response switches. Error scores and time scores for correct responses were recorded.

**RESULTS:** (a) The interpolation of the discrimination task resulted in interference, whereas interpolation of the motor task gave facilitation. (b) Increasing the amount of original learning resulted in decreasing facilitation for the motor interpolated task and increasing interference for the discrimination interpolated task. (c) Increasing the amount of interpolated learning resulted in increasing facilitation for the motor interpolated task and increasing interference for the discrimination interpolated task.

**CONCLUSIONS:** (a) The postulation of two conceptual stages—a selection or discrimination stage and a motor or execution stage—provides a useful means of handling these results. (b) Such a two-stage analysis reveals concrete means of relating verbal and psychomotor learning. (c) Lewis' suggestion of the possibility of a need for a two-factor psychomotor retroaction theory is tentatively supported. (Slides)

**Roberts, S. Oliver, & Gunter, Laurie Martin.**  
*(Fisk University and Meharry Medical College)*  
**An evaluation of the Kuder interest patterns of Negro nurses.**

**PROBLEM:** (a) To determine the vocational interest patterns of Negro Americans in several phases of the nursing profession. (b) To relate these patterns to performance in and attitude toward their chosen field as evaluated by ratings and questionnaires.

**SUBJECTS:** 117 females including instructors (5), registered nurses (33), student nurses (33), licensed practical nurses (17), student practical nurses (12), attendants (7), and prenursing students (10).

**PROCEDURE:** The Kuder Preference Record was administered during 1952–1953. Ratings of over-all nursing performance were obtained from supervisors or instructors. Opinions relative to job satisfaction were secured from questionnaires.

**RESULTS:** (a) The typical nursing interest pattern of high scientific and social service scores was found with the present total group; the social service score

was even higher than that reported by Kuder. (b) This pattern also held for the subgroups, except licensed practical nurses with the lowest scientific scores, and attendants with the lowest social service scores. Student nurses and prenursing students showed the most pronounced pattern and surpassed all other *Ss* and Kuder's groups in both areas. (c) Further evidence for the suitability of the Kuder was observed from the ratings and questionnaires, in that higher ratings and greater satisfaction were found to be consistently associated (though not statistically significant) with the typical Kuder pattern at all levels of nursing.

**CONCLUSIONS:** (a) The present *Ss* were found to have virtually identical patterns of interests compared with other members of their profession. This is in marked contrast to the "racial" discrepancy noted in studies of other occupations using different interests tests. (b) The general trends of the present study suggest that the Kuder is a satisfactory counseling aid for individuals of this minority who are engaged in or expect to enter the nursing profession. (Slides)

**Roberts, Warren W., Miller, Neal E., & Delgado, J. M. R. (Yale University)** **Motivation of learning by electrical stimulation in the diencephalon.**

**PROBLEM:** To determine whether the strong emotional response elicited by electrical stimulation of the diencephalon of normal, waking cats can motivate learning.

**SUBJECTS:** 10 cats.

**PROCEDURE:** Using a chronic preparation technique, six-point electrodes were implanted in the diencephalon or the motor cortex. Five animals were prepared with diencephalic electrodes, four controls with motor cortex electrodes, and one with both. The points giving the strongest emotional arousal or comparable motor responses were used for tests. All animals were tested in an apparatus having one white and one black compartment separated by a hurdle. With the door above the hurdle closed, the animals were alternately placed in one compartment and stimulated, then placed in the other compartment without stimulation. After a series of training trials, stimulation was stopped, the hurdle door was opened, and the animal was placed alternately in the two compartments to determine whether he would show a preference.

For the second test, the animal was trained to eat food in a special cage. He was then stimulated when he started to eat.

For the third test, the animal was trained to turn a wheel to escape shock. With a little more training, this response was transferred to the emotional state

produced by diencephalic stimulation. Then the centrally induced emotional state was used as an unconditioned stimulus to condition the wheel-turning response to a number of stimuli.

**RESULTS:** In the two-compartment box, the diencephalic cats showed a significant preference for the nonstimulation side. The control Ss having a motor response showed no preference.

In the eating test, the diencephalic animals learned to avoid the food, but the motor controls continued to eat. In the conditioning test, successful avoidance conditioning was achieved in the diencephalic animals.

**CONCLUSION:** There is an area in the diencephalon where electrical stimulation will elicit an emotional response which acts like a drive to motivate learning. Little or no learning is produced by elicitation of a comparable motor response from stimulation of the motor cortex. (Slides)

**Robins, Alexander R., Willemin, Louis P., & Brueckel, Joyce E.** (*Personnel Research Branch, The Adjutant General's Office*) **Exploratory study of echelon differences in efficiency ratings.**

**PROBLEM:** A pilot study was conducted to determine whether an officer's efficiency rating is related to the echelon level (company, battalion, etc.) of his unit assignment, independently of possible grade or branch differences noted in earlier research.

**SUBJECTS:** 1,407 Regular Army captains and lieutenant colonels serving in seven different echelon levels of the infantry, quartermaster, and engineer branches of the Army.

**PROCEDURE:** A three-way classification table by echelon, grade, and branch was prepared, showing the mean and standard deviation of efficiency ratings in each cell. Although comparison of branch means for each echelon-grade category showed one branch lowest more often than would result by chance alone, the differences were small enough to justify combining branches. When this was done, the average rating for captains was about equal to that of lieutenant colonels at each echelon level. The two grades were therefore also combined, and the relationship between efficiency ratings and echelon was examined by simple analysis of variance and computation of the correlation ratio.

**RESULTS:** The analysis of variance showed a relationship between echelon level and efficiency ratings which was significant at the .01 level. The magnitude of this relationship as measured by a correlation ratio was .25.

**CONCLUSIONS:** These findings suggest that there is a small but definite nonlinear relationship between echelon and efficiency ratings which appears independent

of grade and branch. The results of this pilot study indicate that a major study of echelon differences, including more grades and branches, is definitely warranted.

**Robinson, John S.** (*Yerkes Laboratories of Primate Biology*) **Relative discrimination in chimpanzees.** (Sponsor, K. L. Chow)

The typical animal discrimination experiment involves training Ss to secure a reward or escape punishment by appropriate differential response to individual stimuli. The learning component in this technique tends to obscure the perceptual nature of the discrimination process. Discrimination variables could be explored more adequately with a technique that does not require training with the stimuli to be discriminated. Such a technique would have to provide an objective means of determining if S sees a pair of stimuli as "same" or "different" the first time the stimuli are presented.

**SUBJECTS:** Six chimpanzees, 3-6 years old, from the primate colony of Yerkes Laboratories. They had previously received extensive matching from sample training.

**PROCEDURE:** Ss were trained to displace a base with a pair of identical objects on it and to avoid one with two nonidentical objects. Object-pairs consisted of the six possible combinations of a red triangle, blue disc, and black cube. The Ss received 40 trials daily until they made 90% correct choices on 4 out of 5 successive days. A generalization test was then given. Twenty test trials with new objects on each trial were alternated with 20 trials using the training objects. Controls precluded consistent correct response on the bases of cues from E, positional cues, or object preferences.

**RESULTS:** Prior matching from sample training facilitated learning of the present task. Consistent correct response to training object-pairs developed quickly. Frequency of correct response on the generalization test was significantly above chance ( $p < .001$ ).

**CONCLUSIONS:** The results indicate that the training procedure described here provides a technique for investigating discrimination more or less directly. The Ss responded differentially on the basis of perceived identity versus nonidentity of the test object-pairs rather than on the basis of some learned reward or punishment value of the specific stimuli. (Slides)

**Rodgers, Robert R., MacKenzie, Jean N., Stein, Morris I., & Meer, Bernard.** (*University of Chicago*) **Personality characteristics discriminating reactions to human relations training.** (Sponsor, Morris I. Stein)

This study was designed to investigate the characteristics that discriminate between Ss who re-



sponded positively or negatively to a series of discussions on human relations problems encountered in their jobs. The discussions attempted to assist the men in improving their interpersonal relationships. The *Ss* were 12 chemists who made up two work groups in a research organization.

Data on reactions to the program were obtained from follow-up interviews six months after the end of the discussions. Response to the experience was defined in terms of the following variables: presence or absence of self-insight, positive or negative evaluation of the self, positive or negative attitude toward the work group, attitude toward the job, future plans, and actions taken to improve conditions on the job.

Each *S* was rated by two *Es* independently on each of the variables, and significant reliabilities were obtained. Since all the variables were intercorrelated, a single score based on the sum of the ratings served as the measure of *S's* benefit from the program.

Rank orders on "benefit from program" were found to be positively correlated with the following variables measured prior to the group discussions: energy, educational status, self-insight, and lack of dependency in work situations; and negatively correlated with length of time in the organization and age.

These factors suggest that an *S's* gain from the group experience is dependent upon the interaction between his personality integration and potential for "movement" with the increased permeability of barriers in the structure of the work group that occurred as the discussions progressed. Those who benefited from the program were further reinforced in their new behavior patterns by their colleagues who gave them more positive choices on sociometric measures.

Rodnick, E. H. *see* Kalish, H. I.

Roe, Anne. (New York City) **A new classification of occupations.**

This paper proposes a new classification of occupations, based upon a two-way breakdown, which results in an 8- by 8-celled table. Occupations are first subdivided by their primary focus into three major groups: A. Physical activities; B. Personal interactions, individual and group, manipulative and supportive; and C. Knowledge of the world and of the works of man. Groups B and C are further subdivided. For greater convenience only the final subdivisions are numbered. They are: I. Physical activities—the use of the body, particularly the musculature and sensory apparatus, with no more than the simplest tools; II. Social and personal welfare and personal service; III. Persuasive business contacts; IV. Government and business; V. Mathematics and the physical sciences; VI. Biological sciences; VII. Humanities;

VIII. Arts. It will be noted that this classification takes into account the differentiation of interests, although not solely based on this. The other breakdown is by the function of the individual in the occupation. There are four major kinds of functions: innovation, transmission, application, and support or maintenance. Three of these are further subdivided into levels of responsibility and skill. These final subdivisions are: 1. Innovation and independent responsibility; 2. Transmission, professional level; 3. Transmission, semiprofessional level; 4. Application, professional level; 5. Application, semiprofessional level; 6. Support and maintenance: specialized skills; 7. Support and maintenance: semiskilled; 8. Support and maintenance: unskilled. In general, levels of responsibility, skill, and capacity are highly correlated; in cases of conflict the level of responsibility is the decisive criterion. Functions 2 and 3 parallel 4 and 5 in terms of level, but with this exception the hierarchical arrangement is fairly exact. Use of the classification will be exemplified, and comparisons with other classifications will be made. (Slides)

Rogge, Hermann *see* Findlay, Donald C.

Roney, H. Burr *see* Evans, Richard I.

Rosen, Alexander C. (*Psychological Clinic, Contra Costa County, California*) **Change in perceptual threshold as a protective function of the organism.**

The experiment was designed to test the hypothesis that the goal of perceptual behavior is to maintain the integrity and equilibrium of the organism. Behavior that leads to a reduction of disturbance and anxiety will be preferred when the organism is given the choice. In the absence of such choice the organism will attempt to minimize felt or perceived discomfort.

If the perception of a stimulus is painful to the organism and it is not able to act directly to avoid the stimulus, then the perception of this stimulus will be disrupted.

If the perception of the stimulus will aid the organism in avoiding a painful situation, then the organism's ability to perceive this stimulus will be enhanced.

These hypotheses were tested by subjecting various groups of individuals to several contrasting situations. For some of the groups the correct perception of a tachistoscopically presented stimulus would avoid an electric shock. For other groups the electric shock was such that the individual could not avoid it by a correct perception.

Where *Ss* were able to avoid punishment by correct perception, the perceptual duration threshold was lowered and perceptual sensitization was obtained.

For the other groups where the punishment could not be avoided, the organization of the perception was disturbed and perceptual disruption occurred.

The results were obtained only in situations where the individual was clearly able to differentiate the consequences of the perception. They were also independent of the quantity of the shock administered to the organism. The major hypotheses of the theory have been supported by the experimental results.

**Rosen, Sidney.** (*Research Center for Group Dynamics, University of Michigan*) **Some effects of previous patterns of aggression on interpersonal relations in new groups.**

**PROBLEM:** To discover certain consequences of two behavior patterns of maladjustment—an overaggressive pattern and an overinhibited pattern—for peer group relations. The eventual goal is to locate simple dependable measures indicative both of personality pattern differences and of differential peer group relations.

**SUBJECTS:** 60 preadolescent and young adolescent boys organized into eight cabin groups in a four-week camp of social agency referrals.

**PROCEDURE:** Two sets of items were selected from a previously used maladjustment inventory. The overaggressive syndrome was characterized by 11 items such as impulsiveness, destructiveness, pathological lying and theft, bullying. The overinhibited syndrome was characterized by 10 items such as withdrawing behavior, enuresis, overdependence, indecision. Categorization into either pattern depended on the boy's having been rated high on at least 50% of the relevant items. (Ratings were based on previous case history analyses.) Those Ss who fell into neither pattern were classified into an intermediate (relatively adjusted) category.

In camp, interpersonal behavior was observed daily. Subjects and counselors were interviewed individually.

Predictions were made to 19 variables concerning S's influence and affect relations with peers and counselor, both as independently observed and as perceived by peers and counselor.

**RESULTS:** Most of the predictions were realized. For example, the overaggressive S was generally most active, coercive, and successful in attempting to influence peers, and highly resistant to peer and adult demands. Yet his peers attributed only average power and fighting ability to him. The intermediate S, though less manifestly influential, was seen by peers to have higher power and fighting ability, and was more liked. The overinhibited S was least active, coercive, and successful, and conformed most to peer and adult influence.

**CONCLUSION:** Objective extrapolations can be made from the more clinically oriented syndromes of aggression to interpersonal perceptions and behaviors in new peer group settings.

**Rosenbaum, Milton.** (*University of Texas*) **The effect of stimulus and background factors on the volunteering response.**

**PROBLEM:** Helson's adaptation-level theory holds that a response is determined by the pooled contributions of three stimulus factors: the stimulus in the immediate focus of attention, background stimuli, and residual stimuli. This study tests the hypothesis that the volunteering response, acceptance or rejection of an invitation to donate one's services, is determined in part by factors existing in the external situation, namely the strength of the stimulus request and the reaction of prior invitees. The former constitutes the immediate stimulus and the latter the background stimulus.

**SUBJECTS:** 135 male college students were randomly selected from among university library readers.

**PROCEDURE:** Three conditions of stimulus-request strength and three conditions of social background were employed. The Ss were approached by an E and invited to participate in a psychological experiment. The stimulus requests varied in strength from a strong plea for cooperation to a weak statement implying lack of interest in obtaining assistance. Under two of the background conditions an instructed assistant who was seated beside S was approached first. He either accepted or rejected the invitation. The naive S was then approached. Under the third background condition no assistant was employed and therefore S did not witness the reaction of another person prior to the presentation of the invitation to him. A rating scale designed to measure volunteering readiness was administered to all Ss.

**RESULTS AND CONCLUSIONS:** Stimulus and background factors are effective determinants of the volunteering response. The actual response is determined by the pooled contributions of both factors. A third stimulus source, residual or personality factors, uncontrolled in this experiment, admittedly contributed to response determination, but the results of the experiment demonstrate that valid prediction of a social response is possible despite lack of knowledge of "internal" factors. (Slides)

**Rosenberg, Milton J.** (*University of Michigan*) **Planned and unplanned attitude change in the introductory psychology course.**

The development of a general theory of attitude change requires the formulation of a testable model concerned with the relationships between affective

and cognitive processes as they bear upon given phenomenal objects or classes of objects.

The present theory utilizes as its cognitive elements the values of individuals and their beliefs about the value-attaining instrumental powers of the attitude object. Attitude is defined as "the comparatively lasting affective predisposition experienced upon the psychological presence of a given object." A number of relationships are specified whereby cognitions about the object will covary with affective predispositions (attitudes) toward the object.

A group of hypotheses derived from this model was tested on a group of 117 college students in a research project concerned with attitudes toward "allowing admitted communists to freely address the American public." Twenty-three out of 24 predicted relationships (between attitude position and various aspects of associated cognitive structure) were confirmed at probabilities of .001 or better.

The model from which these hypotheses were derived provides a way of formulating and analyzing the types and bases of attitude change that typically occur in the introductory psychology course.

The beliefs established in the student through the introductory course, to the degree that they engage his major value orientations, will have attitude-modifying consequences.

Among the types of attitude change that may be analyzed and planned in these terms are attitudes toward self, individual differences, given political ideologies and propositions, moral norms, personality deviations, psychotherapy, and psychology itself.

The development of a theoretical model of attitude change may be furthered by attitude-change research which is built into the introductory course itself.

**Rosenberg, Nathan** *see* Izard, Carroll E.

**Rosenberg, Seymour** *see* Berkowitz, Leonard

**Rosenberg, Sheldon** *see* Gollin, Eugene S.

**Rosenblatt, Bernard** (*Worcester Youth Guidance Center*), & **Solomon, Paul**. (*Myles Standish State School*) **Structural aspects of Rorschach responses in mental deficiency.**

The purpose of this study was to investigate the structure of perceptual functioning in mental defectives. Rorschach responses of 80 adult, familial, institutionalized mental defectives were scored for location using the modified location scoring system developed by Friedman. The theoretical framework for the study was the genetic theory of Werner. Comparison was made with responses of schizophrenics, brain-damaged adults, and children, who had previously been studied with these scores.

Our 80 Ss were divided into 5 groups of 16 each, the groups being formed on a basis of Stanford-Binet IQ's. The lowest group had a mean mental age of 5 years, while the highest group had a mean MA of 12 years.

It was possible to discriminate levels of mental deficiency by means of these scores. The perceptual functioning of the groups showed increasing differentiation and integration with increasing MA. In accordance with genetic theory, it was shown that children function in a way that contains anticipations and antecedents of higher functioning, while adult defectives, being at a relatively fixed level, do not. Schizophrenic and brain-damaged Ss, by comparison, show vestiges of higher functioning from which they have regressed.

Implications of the study for general Rorschach theory are discussed, with special attention given to the interpretive significance of mediocre and vague whole responses. Mediocre *W* responses do not seem to represent abstraction or higher mental processes. Vague *W* responses seem to be primarily an indication of anxiety and regression.

**Rosenblatt, Bernard** *see* Solomon, Paul

**Rosenzweig, Mark R., & Wyers, Everett J.** (*University of California, Berkeley*) **Binaural interaction in the midbrain of the cat.**

**PROBLEM:** Rosenzweig has reported evidence that the responses of the auditory cortex show functional correlations with the localization of sound and with other phenomena of binaural perception. However, decorticate animals also show some ability to localize sounds. Therefore the present study was undertaken in order to determine whether binaural interaction occurs at midbrain auditory centers.

**SUBJECTS:** Adult cats.

**PROCEDURE:** Electrophysiological responses were recorded at the inferior colliculi of anesthetized cats while click stimuli were presented to the ears. The two ears were stimulated independently. The differences in time of arrival of the clicks at the two ears and the intensities of the clicks were varied in order to produce stimulus conditions under which phenomena of binaural perception occur.

**RESULTS:** At the colliculus of either side, the response evoked by stimulation of the contralateral ear is usually larger than the response evoked by equally intense stimulation of the ipsilateral ear. The response evoked by stimulation of one ear is affected markedly by prior stimulation of the other ear. The change in the amplitude of the response to the second stimulus was plotted as a function of the difference in time of arrival of the clicks at the two ears. Comparison with cortical functions plotted in the same way re-



veals that the interaction effect is neither so great nor so long lasting at the colliculus as it is at the cortex.

The commissure running between the colliculi has been suggested as an important channel for binaural interaction. However, it was found that severing the commissure did not abolish the interaction observed at the colliculi.

**CONCLUSION:** The binaural interaction observed at the cortex can be accounted for partially, but not completely, in terms of the interaction observed at the colliculi. (Slides)

Roshal, Sol M. *see* Kopstein, Felix F.

Rosner, Benjamin, & Thorndike, R. L. (*Teachers College, Columbia University*) An "achievement test" approach to determining job requirements.

**PROBLEM:** An "achievement test" technique for carrying out efficiently a large-scale analysis of Air Force job requirements is described, and results of preliminary investigations are presented.

**SUBJECTS:** The sample consisted of 372 "permanent party" airmen stationed at Lackland and Randolph Air Force bases, representing 20 different ground crew AFSC's.

**PROCEDURE:** Factorial analysis of the intercorrelations of 130 psychological and physiological job characteristics had revealed 18 relatively independent job dimensions. These factors provided the framework for job delineation and classification.

Factorial achievement tests were constructed to measure the importance of each factor for each job. Specific job activities were culled from completed Job Analysis Schedules and assigned to factors on the basis of the combined judgment of the staff. Airmen indicated whether they did or did not perform the activity. Options were provided to indicate frequency of activity participation. Three preliminary forms of the AF Job Activity Scales were developed; each form attempted to measure 5 factors, with some overlap. The original scales were "purified" on the basis of item statistics and related considerations, and their intercorrelations computed. Analysis of variance was employed to detect differences among grade levels and AFSC's with respect to particular factors. **RESULTS:** Items in single scales show high internal consistency. The absolute values of the intercorrelations among the factors ranged from .062 to .710 with a median  $r$  of .361. There are significant differences among grade levels and jobs with respect to particular factors.

**CONCLUSIONS:** "Tests" like the AF Job Activity Scales present a promising approach to the measurement of job requirements. The scores they yield ap-

pear to afford a practicable basis for job classification. The development of a "lie" scale analogous to that of the MMPI seems warranted to correct for "halo" effect.

Roy, Howard L. *see* Johnson, Cecil D.

Rozran, Gilbert B. (*General Electric Advanced Electronics Center, Cornell University*) The electronic measurement of disjunctive eye movements.

**PROBLEM:** (a) To find out whether or not disjunctive eye movements can be reliably measured by means of electro-oculography; and (b) to discover whether or not there are any discernible differences in type of eye movements in terms of lateral and vertical near-distance phoria scores.

**PROCEDURE:** 65 Purdue University students were tested on the Ortho-Rater for lateral and vertical phoria at near distance. Silver chloride electrodes were attached temporal and nasal to each eye. Eye movements were recorded on an oscillograph. Three trials were administered to each S. During each trial, S remained in the dark for 1 min. to allow the eyes to assume the physiological position of rest. A target light was turned on, exposing the grid on the surface of the target box at a distance of 13 in. from S's eyes. The fine lines on the grid provided a stimulus for fusion.

**RESULTS AND CONCLUSIONS:** The Pearsonian  $r$ 's of .919 and .887 for the left and right eye, respectively, indicate that the Oculograph employed can be expected to give a reliable measurement of disjunctive eye movements. Four types of eye movement records were noted: convergence and divergence—as would be expected—and two unexpected classifications—"fluctuation" and "same." The "fluctuation" classification consisted of those individuals whose eyes continued to converge and diverge repetitively while the fusion stimulus was on. The three "same" category Ss, all with near esophoric phorias, made no observed movements from the screened situation to fusion.

The four eye movement groups were treated by analysis of variance. An  $F$  significant at the 1% level was found for eye movement groups by lateral phoria score. It was concluded that there is a discriminable relationship between lateral phoria and eye movement from physiological rest to fusion. (Slides)

Rudel, Rita G. (*Psychophysiological Laboratory, New York University*) A re-evaluation of the dichotomy of absolute and relative responses in transposition. (Sponsor, H. L. Teuber)

**PROBLEM:** Recent work on transposition of response in children suggests (Kuenne, Alberts, and Ehrenfreund) that relative choices occur only to the extent

predicted by Spence's "gradient of generalization." Children's transposition exceeding the limits of the gradient has been attributed to their "verbal control." Examination of actual data of the cited and other studies (Jackson *et al.*, Hunter) casts doubt upon the adequacy of S-R theory and on the usual dichotomy of absolute vs. relative responses. The present study tests the predictive value of Spence's gradient in verbal and preverbal children.

**SUBJECTS AND PROCEDURE:** 150 children (21 to 66 months) were used in three basic experiments: (1) size discrimination followed by tests at six points of a continuum, in the manner of Alberts and Ehrenfreund; (2) size discrimination followed by test choice of a simultaneously presented continuum of eight sizes; and (3) intermediate size discrimination followed by test choice (a) immediately and (b) 3 hr. after learning.

**RESULTS:** Under all conditions, results differ from those predicted by Spence's hypothesis. If one plots frequency of relative responses against distance of test stimuli from the training pair, one obtains a curve which is U-shaped rather than exponential as demanded by S-R theory. Verbalization had no demonstrable influence on test choice. Specifically, Exp. 1 proved that younger children differed from older children in showing more primary preferences for certain positions or sizes, interfering with both absolute and relative choice. Experiment 2 showed marked dependence of test response on the way in which the comparison stimuli are displayed, a dependence not predicted by any current theory. Experiment 3 indicated that lapse of time between training and test tended to produce either random behavior or an increase in relative responses. In general, available theory fails to predict the outcome of any of our three experiments. Suggestions for construction of an alternative theory are offered.

**Ruja, David H.** (*Los Angeles State Mental Hygiene Clinic*) **Evaluation of prefrontal lobotomy in schizophrenic patients.**

**PROBLEM:** Psychosurgery has been practiced since primitive times. Yet, even within the modern era of use, and in spite of dogged contentions by some, the extensive employment of psychosurgical techniques on psychotic patients has left us with inconclusiveness and controversy concerning their effectiveness. Through psychological testing procedures this study aimed to determine personality changes following prefrontal lobotomy on schizophrenic patients, to compare those changes with results of other studies, and to evaluate the factors that might contribute to the similarities or differences found between different observers. Fifteen hypotheses, drawn from the major

studies reported in the literature and constituting the important presumptions and conclusions of researchers in the field of psychosurgery, were tested.

**SUBJECTS:** 25 patients who had been diagnosed as having the disease schizophrenia for a period of three years or longer and who had not been amenable to either electric convulsive and/or insulin coma therapies.

**PROCEDURE:** The patients were tested with the Bender-Gestalt, Wechsler-Bellevue, Rorschach, Thematic Apperception Test, Rosenzweig P-F Test, and MMPI one month preoperatively, one month postoperatively, and six months postoperatively. The Wechsler-Bellevue, Rorschach, and MMPI were scored conventionally. The TAT and P-F were scored by tabulating the theme contents, and the B-G was scored by a rating-scale procedure. Statistical methods of analyses (chi square, *t* ratio, departure from 50-50 probability) were used in treating the data.

**RESULTS:** Only one of the 15 hypotheses could be confirmed, namely, that the general intelligence level of the lobotomized patient tends to remain the same as preoperatively.

**DISCUSSION:** The factors contributing to the variability of results between different studies were identified and discussed.

**CONCLUSIONS:** When group rather than individual data were considered, prefrontal lobotomy little affects the psychotic personality of the schizophrenic, and extreme caution must be employed in generalizing about the effect of surgical intervention on the brains of schizophrenics.

**Russell, David L.** (*Bowdoin College*) **A comparison of rating, test, and sociometric methods of personality measurement.**

In order to clarify and to understand the many meanings of "adjustment," this study compares three methods of personality assessment which are considered representative of three differing adjustment concepts: statistical, egocentric, and sociometric. The Ss were a group of 61 liberal arts college fraternity men.

Representing the statistical criterion of adjustment were two measures: (a) the Minnesota Personality Scale, a test that measures five traits—morale, social adjustment, family adjustment, emotionality, and economic conservatism; (b) group ratings of the individual on five corresponding bipolar traits. As egocentric criteria of adjustment, each individual contributed three types of self-estimates of the same bipolar traits: self-ratings, ratings expected from others, and ratings given to other group members. A sociometric questionnaire, asking for choices of

associates based upon actual and desired friendship, popularity, and leadership, represented the sociometric adjustment criteria.

Of the three adjustment measures, those involving group judgments of the individual—group ratings and sociometric scores—are most highly related. The relationships become smaller, but still significant, in comparing group ratings with their corresponding personality test traits. Test and sociometric measures of adjustment are insignificantly related. It is noted, however, that most of the significant correlations are low and positive.

Although a few egocentric self-estimates are related in a low and positive manner to the statistical measures of adjustment, the self-judgments are unrelated to sociometric criteria.

It is concluded that, while there are intricate networks of interrelationships existing between traits and their measures, there is much specificity. A person might be well adjusted in a statistical or egocentric sense, but this need not mean that he is well adjusted in the sociometric sense, or vice versa. This implies that an effective personality theory or therapeutic program must account for all possible areas of adjustment.

**Russell, Wallace A., & Storms, Lowell H.** (*University of Minnesota*) **Implicit verbal chaining in paired-associate learning.** (Sponsor, Wallace A. Russell)

**PROBLEM:** While the mediational role of word associations has been established for several performance situations, there are surprisingly few studies that report positive findings with regard to the effects of mediated associations upon learning. Bugelski and Scharlock have demonstrated the effect of one implicit mediating term upon the paired-associate learning of nonsense syllables. The present experiment was designed to study the effects of mediating verbal processes on paired-associate learning when the mediating process is implemented in part by preexisting language habits and extends over more than one implicit verbal term.

**PROCEDURE:** First, 10 chains of word associations, B-C-D, were constructed from normative data on association frequencies. Twenty-three female college Ss then learned a list of A-B pairs, where the A terms were nonsense syllables and the B terms were the initial members of the chains described above. The test situation required that Ss learn another list of A-D and A-X pairs. The D terms were the final members of the associative word chains, and the X terms were not associated with any of the chains. A control experiment revealed that the A-D and A-X pairs did

not differ in difficulty in the absence of chain possibilities.

**RESULTS:** It was found that during the learning of the test list the A-D pairs were correctly anticipated more times than the A-X pairs. The mean difference was 3.74 and the *t* of 3.30 was significant beyond the .01 level. Further analysis indicated that these pairs also were elicited significantly earlier in the learning trials. It was concluded that implicit verbal chains of more than one link had mediated these effects.

Reasons why these results were even more clear-cut than those of schematically simpler previous experiments are discussed, and the theoretical implications of multiple-term mediations are considered. (Slides)

**Sackman, Harold.** (*Rand Corporation*) **An investigation of certain aspects of the validity of the formal Rorschach scoring system in relation to age, education, and vocabulary score.**

**PURPOSE:** 1. To test the validity of formal Rorschach scores for a combination criterion of age, education, and vocabulary score in accordance with the published expectations of Rorschach authorities.

2. To test the formal scores for certain statistical, verbal, intellectual, and perceptual sources of uncontrolled factors that may create interpretive ambiguity. **SUBJECTS:** *N* of 100, 50 male, 50 female, 6 to 25 years of age, lower middle class, superior verbal IQ, white, urban, normally adjusted according to interview and check-list selection procedure.

**SCORING:** Klopfer's system, two independent scorers, third independent scorer for instances of disagreement between the two initial scorers, high and very significant scoring reliability obtained for all scores. **STATISTICS:** Exclusive use was made of nonparametric statistics including linear rank correlation, curvilinear rank correlation, and the sign test. Total responsiveness and sex differences were controlled for all tests. **RESULTS:** 1. Validity: Of 14 formal scores expected by Rorschach authorities to be related to the criterion, only one was valid at the 5% level of significance (*M%*), and one significantly reversed the expected direction (*FM%*). None of the Rorschach scores was valid when tested for the separate effects of age, education, or vocabulary score.

2. Sources of ambiguity: Of 17 hypotheses testing various sources of ambiguity in the scoring system, 15 were substantiated at the 5% level of significance.

**CONCLUSION:** The results of the present experiment, corroborating accumulating evidence in the literature, seem to indicate a lack of validity for the formal Rorschach scoring system which is not consistent with the claims that are traditionally made for it.



**Sakoda, James M., & Cohen, Burt.** (*University of Connecticut*) **Calculation of probabilities for  $2 \times 2$  contingency tables.**

In obtaining probability values for  $2 \times 2$  contingency tables, there is considerable difference of opinion as to the extent of error in the use of chi square, even when it is corrected for continuity. Part of the difficulty arises from the lack of a suitable method of measuring the degree of error. By use of logarithms of exact and approximate probabilities, a method of calculating percentage error has been devised. Examination of  $2 \times 2$  tables for which the smallest expected frequency is equal to 2 reveals that the errors are negligible, except when the total  $N$  increases beyond 40. The analysis indicates that the skewness of the distribution of calculated chi squares, as well as the size of the smallest expected frequency, needs to be taken into account in deciding when the chi-square approximation can be safely used. A simple correction to the smallest expected frequency of a contingency table is proposed to accomplish this. When one of the marginal breakdowns is equal, no correction is necessary. Examination of  $2 \times 2$  tables with corrected expectations of 1 shows that the chi-square approximation yields results close to those obtained by the exact method. The conclusion is that the chi-square approximation for  $2 \times 2$  tables with small expected frequencies is not as limited as most statisticians have claimed.

A short-cut method of calculating exact probabilities for  $2 \times 2$  contingency tables is available. This procedure involves the use of binomial coefficients in place of factorials, which Fisher used. The probability for a single table is given by the product of  $a + b$  taken  $a$  at a time and  $c + d$  taken  $c$  at a time divided by  $N$  taken  $a + c$  at a time. By using this formula, a table of binomial coefficients, and a calculator, exact probabilities can be calculated in short order. (Slides)

**Sampson, Harold.** (*VA Mental Hygiene Clinic, San Francisco*) **The influence of "attraction" on perceived symmetry of attitude.**

In a situation involving two persons, A and B, and an object of mutual relevance, X, Newcomb has hypothesized that certain definable relations between A and B, A and X, and B and X are interdependent. The present study investigates a specific proposition concerning this (hypothetically) interdependent system: the likelihood of perceived symmetry of attitude toward X in the phenomenal field of A is a part function of the "attraction" A feels toward B.

One hundred and forty-two male undergraduate students answered a 58-item questionnaire. Subsequently, pairs of these Ss, strangers to each other,

engaged in a 10-min. discussion not directly relevant to the questionnaire. Each S then answered the questionnaire as he thought his discussion partner would answer it, and finally rated how well he liked the partner.

It was found that as B's likability increased, perceived symmetry of attitude with B toward the series of objects  $X_1, X_2, \dots, X_{10}$  increased. There was a statistically insignificant trend for B's likability to increase with actual symmetry of attitude. There was no relation between B's likability and the accuracy of A's perception of B's attitudes. Analysis of covariance indicated that the relationship between perceived symmetry toward  $X_1 \dots X_{10}$  and likability was significant at approaching the .001 level even after correction for variance attributable to differences in actual symmetry.

This result supports Newcomb's proposition. Certain similarities of the present design to those employed in studies of empathy, social perception, and projection are noted, and certain interrelationships of these studies are suggested. The relevance of Newcomb's formulations to (a) experimental investigation of the relation of identification to attitude formation; (b) methods of modifying attitudes; and (c) attribution of attitudes to others is discussed.

**Sanders, Wilma B.** *see* Osborne, R. T.

**Saul, Ezra V., Hall, Norman B., Jr., & Jaffe, Jack.** (*Tufts College*) **An examination of the principle of vivification as applied to learning from a visual training aid.**

The objective of the present study was to validate the application of the principle of color vivification to the design of visual training aids.

The findings of Von Restorff and other investigators show that the introduction of a "vivifier" or "emphasizer" (e.g., color) to an item in an otherwise homogeneous list of items leads to a facilitation of learning of emphasized items. The present study obtained measures of learning and retention of the labels of a visual training aid, some of which were colored red on an otherwise black and white slide.

The training aid utilized was a cross-section diagram of a baking oven. The number of emphasized labels per slide varied in increments of three, from 0 to 18 of a total of 26 labels. The position on the slide of all labels remained the same, but the color was randomly assigned. Seven groups of Ss, 15 per group, were used, each group being presented with a different slide. Composition of groups was randomly made.

The entire graphic was presented for 15 min.; during the first 10 min. E read aloud and pointed

to each label in random order. After all the labels had been given once, the list was repeated as before. This was to assure that all labels had been called to the attention of all Ss.

Immediate and delayed retention tests were taken by the Ss at 0 sec. and at 48 hr. after the completion of the original learning.

The results indicate that the introduction of more than a limited number of "emphasized" items is associated with some decreased efficiency in total list learning and retention. In addition, the data indicate no systematic advantage in the learning and retention of items which were emphasized by color as contrasted to unemphasized items.

It is concluded that the principle of vivification in relation to visual training aids is not a simple one and that its effects on learning and retention require further analysis. (Slides)

**Saunders, D. R. (*Educational Testing Service*)**  
**Relationships among some concepts and criteria of military leadership.**

**PROBLEM:** To explore the relation of six factorially obtained concepts of military leadership to other concepts and criteria of leadership.

**PROCEDURE:** Each concept or criterion of leadership is expressed in terms of a rank ordering of traits in importance for leadership. Previous analysis of the concepts of leadership held by applicants for admission to the — Academy showed the existence of six primary factor concepts. These concepts were called: I. Well-drilled Leader, II. Self-sufficient Leader, III. Social Leader, IV. Good-follower Leader, V. Leader of Leaders, VI. Universal Leader. For this study, concepts were obtained from three other sources, correlated with the primary concepts, and with each other.

1. Concepts were provided by 74 instructors of the — Academy. These are highly related to factor VI ( $r = .30 - .57$ ). The concepts of instructors in military subjects are also related to factor II ( $r = .29 - .37$ ), while the concepts of the instructors in academic subjects are also, and mostly, related to factor V ( $r = .25 - .45$ ).

2. Concepts were obtained from item analysis of an experimental testing of 294 applicants. Each item in the test presented a forced-choice comparison involving two traits. The concept described by the preference values of the traits is mainly related to factors I (.43), VI (.38), and III (.27). The concept described by the validities of the traits for predicting leadership ratings after one year at the — Academy is substantially related to factor IV (.47).

3. Concepts were derived from data reported by Tupes on the correlations of trait ratings against

criteria obtained in an OCS. High academic averages are related to factor I (.38). High buddy-ratings of officer potential and high military grades in OCS are related to factors I (.33, .46) and II (.21, .38).

**CONCLUSIONS:** These results illustrate the utility of the previous factor study of concepts, and point a way for development of leadership predictors.

**Saunders, D. R. see Frederiksen, Norman**

**Saxe, Carl H., & Berger, Louis M. (*Neuropsychiatric Hospital, VA Center, Los Angeles*)**  
**Augmenting a therapeutic atmosphere.** (Sponsor, Carl H. Saxe)

This study reports the experiences of a clinical psychologist and a psychiatrist in augmenting the therapeutic atmosphere of the women's service of a neuropsychiatric hospital. Hierarchical relationships, communication barriers between levels of personnel and between patients and personnel, resistance to change, and problems of morale among patients and personnel are discussed. The medium of patients' meetings is discussed as a means of lessening "distance" between doctors and patients and as a means of spurring personnel on to broader conceptions of their task. Treatment planning was enhanced by the variety of informal contacts with doctors and other personnel. Psychotherapy became better focused toward the goals of insight as the realistic environment became less threatening and frustrating. Community spirit, the feeling of belonging, became in itself a therapeutic medium. Personnel meetings were complementary to the patients' meetings and served the dual purpose of facilitating communication and working through some of the personal anxieties relating to the care of disturbed psychiatric patients. The specialized skills of each of the members of the personnel became modified and merged to some extent as changing definitions of the task demanded creative use of old skills and the development of new skills and approaches.

**Scherer, Isidor W., & Winne, John F. (*VA Hospital, Northampton, Massachusetts*)**  
**Psychological changes over a three-year period following prefrontal lobotomy.**

**PROBLEM:** To investigate psychological changes occurring in male schizophrenics following prefrontal lobotomy, with particular emphasis on changes between one and three years postoperation.

**SUBJECTS:** 50 white male schizophrenics; 28 operated, 22 controls.

**PROCEDURE:** Operated patients were group-tested before lobotomy and 2 weeks, 3 months, 1 year, and 3 years following; controls were tested at comparable intervals. The test battery measured efficiency in cer-

tain cognitive functions—e.g., memory, abstraction, learning—and assessed certain aspects of personality—e.g., level of aspiration, aversive attitudes. The significance of *net* change in the operated group at selected time intervals was determined for each of 116 variables derived from the 29 tests by means of chi square, *t*, and/or net shift in proportion.

**RESULTS AND CONCLUSIONS:** A previous publication cited four conclusions relating to changes observed during the first postoperative year: (a) there is decreased mental efficiency, possibly associated with organic damage; (b) ego boundaries are strengthened; (c) sexual awareness increases; and (d) rate of action increases, reflecting diminution of inhibitory factors. The present study indicates that at three years postoperation: (a) the trend toward decreased mental efficiency at one year is not continued in 43 of 45 relevant variables; (b) strengthening of ego boundaries is sustained in 26 of 27 relevant variables; (c) increased sexual awareness is sustained in 10 of 11 relevant variables; (d) although increased rate of motoric action is maintained in all of 8 relevant variables, there appears to be an increased inhibition of ideational processes (16 of 18 relevant variables). It is further suggested that nonoperated patients show schizophrenic regression beyond the preoperative level, while lobotomized patients do not, as evidenced by positive findings in 225 of 232 statistical tests. Discussion of qualitative considerations somewhat inconsistent with the quantitative results will be presented. (Slides)

Schmid, John *see* Jensen, Milton B.

Schneider, Stanley F. (*University of Michigan*)

**The prediction of certain aspects of the psychotherapeutic relationship from Rorschach's test: an empirical and exploratory study.**

The general purpose of the present investigation is to relate Rorschach's test and psychoanalytic theory. An attempt is made to derive predictions of the therapeutic relationship from Rorschach data on the basis of inferential reasoning from psychoanalytic theory and projective theory.

**HYPOTHESES:** Each of the following criterion variables, operating in the interpersonal relationship during intensive psychotherapy, can be predicted from Rorschach test scores: dependency, overt hostility, latent hostility, anxiety, capacity for free association, acting out, blocking, capacity for transference.

The Ss of the study were 56 adult, male outpatients, who were given the Rorschach prior to treatment and who subsequently had psychoanalytically oriented therapy for at least six months in a VA Mental Hygiene Clinic.

The criterion data were derived from the judgments of 12 therapists, each treating from three to six patients in the experimental population. The therapists completed for each of their patients a 228-item questionnaire, from which criterion scores were obtained after item analysis. The intercorrelational matrix of these scores on the eight variables was then factor analysed, and this statistical treatment yielded three primary factors: transference, anxiety, and free association.

Eight Rorschach measures were devised to test the hypotheses. Each measure is based upon a configuration of test factors, instead of upon isolated Rorschach variables. The configurations include structural and qualitative Rorschach data, reliably scored, and each component within a configuration receives, a priori, a weight in accordance with its supposed predictive power. A weighted score is thus obtained for each S on each of the predictive measures.

Statistical tests of the hypotheses, made by correlating the scores on the predictive and criterion measures, were found to be significant in seven out of the eight predictions. These tests comprise the major results of the experiment, and indicate that meaningful aspects of the therapy relationship can be predicted from Rorschach configurations.

For purposes of presentation, the major focus will be upon the development of the rationale for the respective measures for one variable, in order to demonstrate an important methodological contribution of the study.

Schoeffler, Max S. (*Indiana University*) **Probability of response to compounds of discriminated stimuli.**

The experiment was performed to determine the probability of a response in stimulus situations composed in part of stimuli to which this response had been conditioned, in part of stimuli to which an opposing response had been conditioned, and in part of stimuli to which neither response had been conditioned. The experiment also permitted a comparison between the obtained response probabilities and exact quantitative predictions of these probabilities derived from the set theoretical model of learning developed by Estes and Burke.

Two hundred and thirty-four male and female college students served as Ss in the experiment. All were trained for 30 trials to discriminate between two disjoint sets of lights, the response required being an appropriate movement of a lever. One hundred and eighty Ss met the criterion of making at least nine correct responses in the last ten trials and were then given a series of test trials on which lights from



the two discriminated sets, and lights that had not been presented previously, appeared simultaneously in varying proportions. Altogether nine different test patterns were used. Each *S* received all nine patterns in a sequence determined by a randomly chosen latin square. After these nine test trials, each *S* again received the same test pattern that had been presented to him on his first test trial.

The results indicated that: (a) the discrimination curve is a negatively accelerated, increasing function as predicted by the theory; and (b) the probability of a response in the presence of a given test pattern is equal to the proportion of component stimuli that are conditioned to the response. Observed response proportions on test trials were in close agreement with the predictions derived from the set theoretical model.

Schpoont, S. H. *see* Ausubel, D. P.

Schrader, William B. *see* Olsen, Marjorie A.

Schubert, Herman J. P. (*Buffalo VA Hospital*) & Wagner, Mazie Earle (*State University of New York*) Sex differences in figure drawings by normal late adolescents.

PROBLEM: A study to establish figure-drawing norms for late adolescents.

SUBJECTS: 1,539 late adolescents consisting of 596 noncollege-going high school seniors, 252 high-school-senior nurse applicants, and 691 college freshmen. The noncollege seniors included 378 males and 218 females; the nurse applicants were all females; and the college freshmen included 195 males and 496 females. Of the college males, 68 were in art education, 64 in elementary education, and 63 in industrial arts; of the college females, 104 were in art education, 325 in elementary education, and 67 in home economics. PROCEDURE: The subjects, in groups, were each given a blank sheet of paper and a soft pencil and instructed to draw a complete person. As each finished, he was asked to write his name and mark the drawing with "1." He was then given a second sheet and asked to draw a person of the sex opposite to that first drawn. RESULTS AND CONCLUSIONS: Because of time limitations, a general summary of findings will be presented.

Schutz, Howard G. (*Quartermaster Food and Container Institute for the Armed Forces, Chicago*), & Polemis, Bernice W. (*Chicago*) A factor analysis of food preferences in relation to selected characteristics of respondents.

PROBLEM: The objective of this study was to investigate the relationship between selected characteristics (age, education, length of Army service, geographical area, and size of town of origin) of groups of respondents, and their relative preferences for 20 foods

included in a survey of food preferences in the Armed Forces.

PROCEDURE: Preferences were measured by means of a nine-category scale, which is described. The variables consisted of 30 groups of respondents; background characteristics were identical within these groups but differed among them. These variables were represented by the average preference rating for the 20 selected foods. These average ratings were ranked, and intercorrelations were computed among the 30 variables on the basis of these ranks using Spearman's rho. An inverted factor analysis was performed on the matrix of these correlations using Thurstone's centroid method. Five factors were extracted and rotated orthogonally until they met the criteria of simple structure, positive manifold, and meaningfulness.

CONCLUSIONS: Two of the five factors were clearly defined; Factor I included the younger men with less service from several areas, Factor II the older men with longer service, primarily from farms in the South. The other three factors were not so clearly defined, but tentative descriptions of them are given. All of the factors are also described in relation to relative food preferences of the respondents. The results are compared with those of other types of analyses of food preference data. (Slides)

Schutz, Howard G. *see* Pilgrim, Francis J.

Schwartz, Marvin, & Beach, Frank A. (*Institute of Human Relations, Yale University*) Effects of adrenalectomy upon mating behavior in castrated male dogs.

PROBLEM: Previous reports from our laboratory showed that in some sexually-experienced male dogs castration produces no change in copulatory behavior. The present experiment was conducted to test the hypothesis that survival of potency in gonadectomized males depends upon androgenic hormone secreted by the adrenal cortex.

PROCEDURE: *Ss* were two young, adult, male beagles. Dog A was observed in five testing series distributed over an 18-month period before castration. Dog B was tested for 6 months prior to castration. During the 3 years following removal of the testes, both dogs were subjected to 8 series of mating tests. Eight months after the final postcastrational test, the animals were adrenalectomized. The dogs were maintained on implanted DOCA and daily injections of cortisone. Cortisone injections were discontinued at least 4 days before the conduction of a sex test. Dog A received a total of 22 tests after adrenalectomy, and Dog B had 21 tests. The postadrenalectomy tests extended to the 49th postoperative day. After the

DOCA pellet was removed, the animals deteriorated rapidly and sexual activity was eliminated, presumably as a result of general debility. Post-mortem examination confirmed the completeness of the operation.

**RESULTS:** Sexual performance after adrenalectomy was not significantly inferior to behavior in tests following castration.

**CONCLUSIONS:** Mating behavior which persists after gonadectomy does not depend upon endocrine products of the adrenal gland. (Slides)

**Schwerin, Erna** (*The Northwest Guidance Center, Lima, Ohio*), & **Fitzwater, Mylen E.** (*Bowling Green State University*) **Comparative reliability and validity of the Healy Completion Test II and a revised form.**

**PROBLEM:** To obtain an estimate of reliability and of validity for the Healy Completion Test II and a revised form, utilizing modern dress and current pictorial environment.

Hypotheses formulated were that the revised test will be more highly reliable and more highly valid than the original form, designed in 1917.

**PROCEDURE AND METHOD:** A random sample of 150 school children (mean age 11.5 years) was obtained from the Lima (Ohio) public and parochial schools. After splitting this group at random into three groups of 50 Ss each, one was tested twice with the old and one was tested twice with the revised test to establish reliability. The third group was tested with both the old and the revised form, for comparison of mean scores and intercorrelation between forms. A time interval of three weeks was used between tests for all groups. Public school grades were used as a validating criterion for both tests.

**RESULTS:** Significant differences between the .01% and 1% levels were obtained between the means in favor of the revised form in the comparison study. No significant difference was found in the reliability between both tests. The validity for the revised form, for the groups tested, was significantly higher than that of the old test (beyond 1% level), when the total group was compared.

**CONCLUSIONS:** The significantly higher validity of the revised form for the groups tested would appear to justify replacing the original form by the revised test.

**Seashore, Stanley E.** (*University of Michigan*) **Group cohesiveness as a factor in industrial morale and productivity.**

**PROBLEM:** To determine, in an industrial setting, some of the conditions that facilitate development of group cohesiveness, and some of the behavioral correlates

of group cohesiveness. Hypotheses were offered regarding the relationship of group cohesiveness to (a) the mental health and adjustment of members, and (b) the development of effective group standards regarding productivity.

**SUBJECTS:** A population of 228 groups (formally designated work sections in a machinery factory) ranging in size from 5 to over 50, and having a total of 5,871 members.

**PROCEDURE:** Data were obtained by a questionnaire completed by all group members. The analysis uses the correlational technique, with group cohesiveness treated as the independent variable, and measures of anxiety, productivity standards, security in relation to the company, member prestige, and opportunity for interaction as dependent variables.

**RESULTS:** Members of high-cohesive groups exhibit less anxiety than members of low-cohesive groups using as measures of anxiety: (a) feeling "nervous or 'jumpy,'" and (b) feeling under pressure for higher productivity. This finding was not confirmed in the case of worry regarding work-related matters.

High-cohesive groups have less variance in productivity within the group, and greater variance in productivity between groups. This is regarded as confirmation of the existence of more effective group standards within high-cohesive groups. The amount of deviation of a group productivity standard from the plant-wide norm is a function of the degree of group cohesiveness, while the direction of the deviation—toward higher or lower actual productivity—is a function of the degree of security of the group in relation to the company. These findings were not significantly confirmed in the case of an alternative measure of group standard, namely, perceived reasonable level of productivity.

Group cohesiveness tends to occur to greater degree in groups of relatively small size, with relatively long duration of shared group membership; this is regarded as confirmation of the hypothesis that group cohesiveness is a function of degree of opportunity for interaction within the group. Group cohesiveness is related to the prestige of member's jobs, but not to degree of uniformity among members as to age and education; these findings are regarded as partial confirmation of the hypothesis that group cohesiveness is a function of the personal attractiveness of members of the group. These factors related to degree of group cohesiveness are interpreted as being determined by factors prior to and external to group formation and therefore as conditions facilitating the emergence of group cohesiveness. (Slides)

**Secord, Paul F.** *see* Jourard, Sidney M.

**Seeley, Leonard C., & Chesler, David J.** (*Personnel Research Branch, The Adjutant General's Office*) **Effects of mandatory showing of ratings to rated Army officers.** (Sponsor, David J. Chesler)

For several years, the Army has had a policy which leaves it up to the individual rater whether or not to show the completed efficiency report (performance rating) to the rated officer. Practice varies considerably in this respect. The suggestion was made by officers in the field that the Army require the rater to show the completed report to the officer rated before it is forwarded to the Pentagon for inclusion in the officer's efficiency file. Numerous arguments have been offered both for and against such a procedure, but little factual information has been brought forth either in the literature or in the military experience. Accordingly, a study was undertaken to determine what results might be expected should the Army require that ratings be shown to the rated officer.

It was hypothesized that mandatory showing of ratings would result in: (a) higher, more lenient ratings, with (b) less spread among them, and (c) less relationship to past measures of officer efficiency. Accordingly, a special rating on the then current Efficiency Report Form was effected as of October 15, 1953 for some 500 captains and 200 majors. These were divided into an experimental group, in which each rater was required to show the completed report to the officer rated, and a control group, in which the rating was made according to regulations and was not required to be shown.

The special rating was compared, in both control and experimental groups, with the most recent previous rating the officer had received, and also with the Overall Efficiency Index (OEI), a composite of ratings received during the previous five years. Means, standard deviations, and intercorrelations were computed. The results supported the first two hypotheses, showing (a) that an increase in mean rating was found when the report was shown to the rated officer, and (b) that the standard deviation tended to shrink, indicating less spread in ratings among the group who showed their ratings. The third hypothesis was not borne out by the results.

**Segal, Julius.** (*Johns Hopkins University*) **A study of the personal and vocational integration of clinical psychologists by the Q-sort method.**

**PROBLEM:** To determine whether clinical psychologists at various levels of training and experience can be distinguished in terms of their personal and vocational integration.

**SUBJECTS:** 36 clinical psychologists divided evenly into 6 groups: first, second, third, and fourth year graduate students in clinical psychology at The Catholic University of America, a recent PhD group, and a group of long-term PhD's. The groups were matched as evenly as possible in age, marital status, and CAVD scores.

**PROCEDURE:** Measures of integration were obtained by means of Q sorts; the 100 Q-sort items utilized were gathered by Rogers from statements made by clients at the University of Chicago Counseling Center. Four "sorts" or self-ratings were obtained from each S: the ratings of the self concept, the ideal self concept, the self concept as a clinical psychologist, and the ideal self concept as a clinical psychologist. The Strong Interest Inventory was also administered to the entire group. Intercorrelations of all four sorts were computed for each S, and the correlation between the self concept and the ideal self concept (between role and goal) was taken as a measure of integration, both in the general and vocational frames of reference.

**RESULTS:** The recent PhD group was found to be the best integrated group in both general and vocational terms; however, no statistically significant differences in Q-sort *r* values were found among the clinician groups.

The married psychologists were found to be better integrated than the single ones to a significant degree; consistent trends are in the direction of better integration among the older and more intelligent clinicians studied.

The Q-sort items distinguish the better and less well-integrated psychologists in terms of emotional stability and soundness of interpersonal relationships.

**Segall, Marshall, & Montgomery, K. C.** (*Yale University*) **Discrimination learning based upon the exploratory drive.**

**PROBLEM:** To determine whether rats can learn a black-white discrimination when the reward for correct choice consists of an opportunity to explore a novel environment.

**SUBJECTS:** Eight female Wistar rats about 110 days old.

**PROCEDURE:** The apparatus consisted of two large Dashiell-type mazes attached to the arms of a T maze. Each arm of the T could be converted into either a black or a white arm.

On each of 14 successive days each animal was given five free-choice trials in the T maze. For half of the animals the black arm of the T was correct; for the other half the white arm was correct. The position of the correct arm was ordered randomly. If an animal entered the correct arm, it was given 1



min. to explore the Dashiell maze; if it entered the incorrect arm, it was detained for 15 sec., then removed. The rats had free access to food and water except during the short experimental periods. Neither food nor water was ever present in the apparatus.

On each trial a record was made of the arm entered, the latency of entry, and the number of 12-in. units traversed in the Dashiell maze when the rat chose correctly.

**RESULTS AND CONCLUSIONS:** No systematic changes occurred in latency of arm entry or in number of Dashiell-maze units traversed per correct choice. However, choices of the correct arm of the T maze increased from 50 to 75% over the 70 trials. The latter value is significantly greater than chance at beyond the .001 level.

It is concluded (a) that the exploratory drive provides a basis for discrimination learning in rats and (b) that the probable mechanism underlying this learning is an increase in, or at the very least a maintenance of, the strength of the exploratory drive. (Slides)

Sells, Saul B. *see* Barry, John R.

Semmes, Josephine *see* Weinstein, S.

Seymour, Charlyne T. Storment, & Weinberg, Joseph A. (*VA Hospital, Long Beach, California*) Emotional tension and gastric activity before and after vagotomy. (Sponsor, Charlyne T. Storment Seymour)

Emotional tension is frequently expressed in somatic dysfunction, particularly of the gastrointestinal tract. Psychotherapy aimed at reducing the incidence of emotional distress has been considered an important adjunct to medical and surgical therapeutics of duodenal ulcers. This is a study of effect of such distress on gastric activities before and after surgical interruption of parasympathetic innervation of stomach by vagotomy. Psychotherapy was not used, patients receiving only medical and surgical treatment for their ulcers.

Twenty-four individuals with duodenal ulcers were selected at random from 150 cases referred for surgery after careful study by medical and surgical gastroenterology services.

A Levine tube was inserted nasally, its position in the stomach was checked by fluoroscope, as was tonicity and motility of area. X rays were taken. Two fasting gastric samples obtained at one-half-hour intervals. Patient was then interviewed regarding emotionally charged personal problems. Third sample withdrawn when evidence of psychological distress appeared, e.g., pupil dilatation, flushing or blanching, perspiration, tremors of lips or hands, etc.

After 15 minutes fourth sample was taken, patient was fluoroscoped, X rays were taken. Procedures were repeated at three weeks and at one year following vagotomy. Samples checked for free acid units and volume, significance of pre- and postoperative differences obtained using a sign test and critical ratios.

Prior to vagotomy there was a reliable increase in gastric activity with emotional distress. Levels of significance obtained were: free acid units, .0001; volume, .01. Motility and tonicity of stomach increased noticeably, evidenced by fluoroscopy and X rays. Following vagotomy overt signs of emotional distress were easily aroused. Neither acid nor volume increased significantly at either trial. Radiological evidence of decreased tonicity and motility was present.

Although patients reacted as strongly to psychological distress after vagotomy as they did before, the upper gastrointestinal tract was not responsive and the ulcers healed. (Slides)

Shapiro, Martin M. *see* Kelley, Harold H.

Shepherd, Clovis *see* Weschler, Irving R.

Shmavonian, Barry *see* Ax, Albert F.

Shneidman, Edwin S. (*VA Neuropsychiatric Hospital, Los Angeles*), & Farberow, Norman L. (*VA Mental Hygiene Clinic, Los Angeles*) Comparison between suicidal and pseudocidal notes in terms of Mowrer's concepts of discomfort and relief.

**PROBLEM:** The contents of two groups of suicide notes, genuine and pseudocidal, are compared in terms of Mowrer's Discomfort-Relief Quotient (DRQ). The hypotheses are: (a) genuine notes will show more discomfort; (b) genuine notes will show more relief; (c) genuine notes will show fewer neutral statements; and (d) genuine notes will show higher DRQ's.

**SUBJECTS:** Two groups of 33 notes were used. All Ss were male, Caucasian, Protestant, native-born, married, and between the ages of 25 and 59. Subjects in the two groups were matched for age and occupational class. Group one was composed of suicide notes (part of a group of 721 genuine notes obtained from the Los Angeles County Coroner, 1944 to 1953). Group two was composed of notes, written by non-suicidal Ss who, at our request, wrote a note "that you would write if you were really going to take your own life." These notes were called pseudocidal notes.

**PROCEDURE:** The 66 notes were typed, coded, and scored for discomfort, relief, and neutral thought units, according to Mowrer's method. The significance

of the differences between the DRQ's, discomfort, relief, and neutral thought units between the two groups was computed.

**RESULTS:** Hypothesis 1 was significant in the opposite direction, with pseudocidal notes showing more discomfort; hypothesis 2 was not confirmed, with neither group showing significantly more relief statements; hypothesis 3 was very significant in the opposite direction, with genuine notes showing more neutral thought units (mostly instructions by the note writer); and hypothesis 4 was not confirmed, with neither group showing higher DRQ's.

**CONCLUSIONS:** In terms of Mowrer's concepts, the nonsuicidal Ss were able to fantasy more discomfort, whereas the genuine suicidal note writers were more concerned with leaving (neutral) instructions for things to do after they were gone.

**Shure, Gerald H.** (*University of Utah*), & **Halstead, Ward C.** (*University of Chicago*) **Intellectual loss following excision of cortical tissue.**

**PROBLEM:** To study the relationship between size and location of excised cortex and impairment of "biological intelligence."

**SUBJECTS:** 72 patients with neurosurgical excisions of tissue. Quantitative estimates of the extent and location of excised cortex were obtained from surgical sketches. All cases involved unilateral removals of frontal or nonfrontal areas. Lesions were classified for three dimensions: location, frontal or nonfrontal; hemisphere, left or right; and size, large or small removals. Eight groups, with six or more patients each, represented all possible combinations of these three dimensions.

**PROCEDURES:** A battery of 15 tests included measures of three of Halstead's four factors of "biological intelligence" in addition to his Impairment Index. The relationship of location, hemisphere, and size of lesion to test performance was appraised by a triple-classification analysis of variance. Test scores were also correlated with size of lesion.

**RESULTS:** Frontals performed more poorly than non-frontals on almost all tests; however, it was only on abstraction (A factor) tests and Halstead's Impairment Index that this difference reached statistical significance. Also in frontal cases, size of lesion was significantly related to impairment in abstraction. The CFF, Seashore Rhythm, and Speech Perception tests, used as measures of psychological vigilance (related to P factor), were all significantly related to size but not to locus of lesion. Tests of verbal-logical ability (related to C factor) showed significantly greater impairment with left- than with right-sided lesions. Additional comparisons indicated that these findings could not be attributed to differences in age

or in the incidence of malfunctioning tissue among the eight groups.

**CONCLUSION:** Test performances representative of Halstead's A and C factors were differentially impaired by lesions in different locations; impairment of test performance connected with his P factor was related to size rather than locus of lesion.

**Shurrager, P. S., & Levy, R. H.** (*Illinois Institute of Technology*) **Mammalian eye vitreous changes follow the dark-adaptation curve.**

Dark adaptation is generally considered to be a retinal phenomenon closely related to rhodopsin photochemistry. These studies show that the curve of dark adaptation can also be followed in the vitreous humor of mammalian eyes which have been subjected to periods of experimentally controlled dark adaptation.

Vitreous humor hyaluronic acid is degraded in dark adaptation and repolymerized in light adaptation. This is demonstrated by differing yields of n-acetyl glucosamine resulting from hydrolytic cleavage of variously dark-adapted vitreous, by differences in turbidimetric assays of variously dark-adapted vitreous after enzymatic cleavage, and by differences after photolytic cleavage. All differences are statistically significant at .001.

Complex changes occur in vitreous humor proteins during dark adaptation. They degrade rapidly at the inception of dark adaptation and variously recombine as dark adaptation progresses. This is demonstrated by sequential color development with ninhydrin. Differences here are also statistically significant beyond .001.

Physical structure differs in light- and dark-adapted vitreous humor. These differences appear in electron micrographs of vitreous humor at varying levels of dark adaptation. (Slides)

**Shurrager, P. S.** *see* Strand, A. L.

**Shushereba, John** *see* Lehrer, Ruth

**Sidman, Murray.** (*Army Medical Service Graduate School*) **The discriminative process in avoidance behavior.**

**PROBLEM:** Previous studies have demonstrated a stable rate of avoidance behavior under a procedure in which every bar-pressing response postponed a brief shock. The present experiment utilized this stable rate as a base line to study the effects of two types of stimulus control of avoidance behavior.

**PROCEDURE:** Group I contained four rats. Each time the animal permitted 20 sec. to pass without a bar press, a .2-sec. shock was delivered. A flashing light appeared 5 sec. before a shock was due, i.e., whenever

the rat waited 15 sec. without responding. A response in the light terminated the light and postponed the shock. Each response in the dark postponed both light and shock.

Group II was similar to Group I, except that when the light appeared it remained until the shock. No avoidance was possible during the light.

Measures were response rates in light and darkness, and cumulative percentage distributions of time intervals between successive responses.

RESULTS: Prior to introduction of the stimuli, the cumulative percentage distributions of intervals between successive responses closely approximated a function derivable from an assumption of random responding in time.

Introduction of a light indicating avoidable shock lowered the response rate in the dark, and increased response probability in the light. The frequency distributions were no longer consistent with the assumption of random responding.

The stimulus indicating unavoidable shock also produced an eventual rate decline in the dark. With the exception of a low response rate in the light, the distribution of responses in time remained essentially random.

CONCLUSIONS: The decreased response rate in the dark under both procedures indicates that a stimulus preceding shock will produce a discrimination, regardless of whether the stimulus indicates avoidable or nonavoidable shock. This supports a Pavlovian interpretation of the discriminative process in avoidance behavior. The importance of the consequences of avoidance responding in the presence of the stimulus, however, is indicated by the difference in the interresponse interval distributions under the two procedures. (Slides)

**Sidorsky, Raymond C.** (*Ohio State University*)

#### **Absolute judgments of size differences.**

PROBLEM: The purposes of this investigation were to (a) determine, within a specified range, the maximum number of sizes of uniformly bright circular test objects that *Os* can reliably discriminate by the method of absolute judgments, (b) derive a scale whose units express equal degrees of discriminability between stimuli that vary along the dimension of size, and (c) determine the effect of stimulus range and number of stimulus categories on the scale. The procedure and methods of analysis developed by Garner and Hake were used.

SUBJECTS: Five college students, three males and two females, served as *Os*.

PROCEDURE: One of a series of circles was displayed for 5 sec. The *Os* were required to respond verbally

with a corresponding code number. The experiment was divided into three successive parts: (a) the discrimination of 15 sizes ranging from 3/64 in. to 17/64 in. in diameter in 1/64-in. step intervals; (b) the discrimination of 8 stimuli within the same range but varying in 1/32-in. step intervals; and (c) the discrimination of 8 stimuli ranging from 7/64 in. to 14/64 in. (middle half of the range in a and b) in 1/64-in. step intervals.

RESULTS: On the average, *Os* discriminated 5 categories of size within a 3/64-in. to 17/64-in. range irrespective of step-interval size. Immediate knowledge of results increased the number to 6 categories. The *Os* tended to underestimate the size of the stimuli over the whole range. The same equal discriminability function was found in spite of differences in range, differences in step-interval size, and the presence or absence of knowledge of results. This scale shows absolute discriminability to be linearly related to diameter in the middle portion of the range with relatively better discriminability at either end.

This research was supported in part by a contract with the USAF, monitored by the Aero Medical Laboratory. (Slides)

**Sigel, Irving, Dreyer, Albert, Hoffman, Martin, & Torgoff, Irving.** (*Merrill-Palmer School*) **Influence techniques: a concept for investigating patterns of adult control of children.**

Research in the field of adult-child relationships continues to stress the vital role played by underlying attitudes and feelings of adults toward children, as affecting the subsequent psychosocial development of the child. Such an emphasis is found in the particular area of adult-child interaction centering about adult attempts to modify the ongoing behavior of the child. Little research has been directed toward the day to day methods which parents use in attempting to alter the behavior of the child. It has been generally asserted that a knowledge of the underlying attitudes and feelings of the parents will allow predictions concerning the important variables involved in affecting the developing child, and therefore the study of the day to day overt behaviors of the adult is superfluous. Review of the literature indicates that the evidence supporting such a unilateral assertion is inconclusive.

It seems reasonable to assume that what has been considered superfluous may actually be of fundamental importance. Hence, research directed specifically at overt parental behavior is needed.

The purpose of this paper is to present a concept that allows us to measure and to evaluate overt adult behavior manifested in the adult-child interaction.



This concept represents that portion of the parents' behavior which is geared toward modifying the ongoing or anticipated behavior of the child. The term "influence technique" has been chosen to designate such behavior.

The identifying characteristics of the phenomenon and the conditions under which it arises are discussed.

Silverthorn, Lee J., Jr. *see* Sweet, Alex L.

Simon, George B. (*AF Personnel and Training Research Center, Chanute AFB*) **The combination of separate reliability estimates.**

Although composite reliability estimates based on several sources of error may be obtained from analysis of variance designs, it may be more feasible at times to obtain separate reliability estimates for each source of error. In such a case, there is a problem of how to combine the single estimates to obtain a composite reliability estimate.

This paper derives a formula for combining the separate reliability estimates for each of two different models. The first model (I) considers each source of error operating singly, e.g.,

$$\begin{aligned} X_1 &= \bar{X} + e_1 \\ X_2 &= \bar{X} + e_2 \\ &\vdots \\ X_n &= \bar{X} + e_n \end{aligned}$$

and results in the following composite reliability:

$$R_I = \frac{1}{1 + \frac{1-r_1}{r_1} + \frac{1-r_2}{r_2} + \dots + \frac{1-r_n}{r_n}}$$

The second model (II) considers several errors operating at the same time, e.g.,

$$\begin{aligned} X_1 &= \bar{X} + e_1 \\ X_2 &= \bar{X} + e_1 + e_2 \quad (\text{or } X_2 = X_1 + e_2) \\ &\vdots \\ X_n &= X_{n-1} + e_n \end{aligned}$$

and results in the following composite reliability:

$$R_{II} = r_1 r_2 \dots r_{n-1} r_n.$$

The relationship between the two composite estimates is discussed. It is shown that for three separate reliability coefficients

$$R_I = R_{II} \frac{1}{r_1 r_2 + r_1 r_3 + r_2 r_3 - 2r_1 r_2 r_3}$$

from which it follows that for the same set of values of the  $r$ 's,  $R_I \geq R_{II}$  and  $R_I = R_{II}$  only if two or more of the original  $r$ 's are unity. It is noted, however, that if properly estimated the  $r$ 's of Model II will ordinarily exceed those under Model I. In a realistic situation, therefore, it is expected that  $R_{II}$  will exceed  $R_I$ . This relationship is demonstrated by a sample application.

Singer, Jerome L. *see* Lane, Robert C.

Skinner, B. F. *see* Lindsley, Ogden R.

Slabodkin, Irving, & McGuire, Carson. (*University of Texas*) **Types of motivation and school achievement.**

The experiment tested hypotheses about the estimation of motivation from behavior journals and relationships with other variables including school achievement. Three kinds of motivation—sensory-motor (SMV), cognitive (CMV), cathectic (AMV)—were defined operationally for three male and three female judges. A sample of 96 Anglo pupils, evenly divided by sex, was drawn from basic, average, and advanced curricula of grades seven and nine in a junior high school. The six judges each allocated global SMV, CMV, AMV scores ranging from 1 (low) to 7 (high) to one-week diaries of activities written by each S.

Over-all coefficients for validity (.629) and reliability (.632) indicated statistical objectivity (.995) but represented considerable unexplained variance in motivation scores. Analysis of variance in independent and correlated observations not only identified constant sources of error among judges but also permitted separate tests of main effects and interactions. Whereas girls had an even distribution of motivation scores, boys had higher SMV's with lower CMV's and AMV's. Pupils in basic curricula had significantly lower scores, later explained by discrepancies in family status and mental function. Age-graded differences in type of motivation by curriculum also appeared.

Two kinds of achievement criteria were employed. One was an achievement difference value (ADV) for gain in basic skills during the year. The other was total teacher marks (TTM) in English, mathematics, and social studies. In a multivariate analysis, the most efficient equation (.501) showed that ADV was a positive function of CMV and a negative function of SMV, with CMV a negative correction element. That for TTM (.562) was a positive function of peer status, CMV, and mental function, a negative function of SMV, with family status negative and AMV positive as correction variables. The significant results

would encourage further study of types of motivation and their relationships. (Slides)

**Slutzky, Jacob E.** (*Bureau of Child Guidance, New York City and Yeshiva University*) **Some factors in the differential diagnosis of pseudo mental retardation.**

**PURPOSE:** To investigate whether the differential diagnosis of pseudo mental retardation from true mental retardation can be established at time of initial examination by means of psychometric tests.

**SUBJECTS:** Children who were adjudged mentally retarded and placed in special classes and were subsequently re-examined. Two groups of 31 children each were selected; the improvers, who demonstrated significant positive change in IQ (i.e., minimum gain of 8 points in IQ on the Stanford-Binet with minimum retest IQ of 80, and the unimprovers, who showed insignificant change in level of intellectual functioning from test to retest.

**PROCEDURE:** Both groups were equated for chronological age and IQ at time of initial examination, as well as for length of stay in special classes. Mean chronological age was 9 years and mean IQ 72; average length of stay in special classes was 2½ years. All children were given Form L of the Revised Stanford-Binet, and the Goodenough Draw-A-Man Test upon both initial and re-examinations. Comparison of percentage of improved and unimproved groups passing Binet and Goodenough items, as well as the relationship between Stanford-Binet and Goodenough scores, was determined for both initial and re-examinations.

**RESULTS:** At time of initial Stanford-Binet examination the group which was found to have improved significantly surpassed the group found unimproved on the following items: similarities and copying a diamond at Year VII, and change making at Year IX. These items represent abstract ability, visual-motor form reproduction, and the ability to apply previously learned knowledge to a new situation. No significant differences were found on memory- or vocabulary-type items. At time of re-examination, the group found improved not only surpassed the unimproved on the types of items previously referred to, but also on vocabulary and memory items. If it is assumed that initial functioning of the improved group was impaired owing to emotional factors, it would seem that memory- and vocabulary-type items are particularly vulnerable to emotional stress. On both initial and re-examinations the unimproved group tended to do better on the Goodenough than on the Stanford-Binet. The improved group tended to function at a higher level on the Binet than on the Goodenough.

**CONCLUSIONS:** In formulating differential diagnosis of pseudo mental retardation, attention should be focused on the areas of abstraction and visual-motor form perception. More carefully graded scales in these areas might be helpful in arriving at clearer diagnostic pictures.

**Smith, A. Arthur** *see* Malmö, Robert B.

**Smith, Clagett** *see* McGinnies, Elliott

**Smith, Henry Clay, & Armour, Jerrold B.** (*Michigan State College*) **Student attitudes in relation to achievement in psychology classes.**

**PROBLEM:** Can achievement in psychology be predicted from student attitudes?

**SUBJECTS:** 100 general psychology students in two sections of the same instructor.

**METHOD:** The following measurements were obtained from the 100 students in the lecture-discussion classes: *achievement*, from the total of four objective tests of vocabulary, facts, and principles; *achievement gains*, from final scores minus pretest scores on equivalent 90-item tests; and eight attitudes, from scales with reliabilities ranging from .58 to .88. The correlations between the attitude scores and achievement and gains were obtained.

The relationships between attitudes and achievement were checked in two ways: (a) repetition of the study in an advanced class under a different instructor ( $N = 36$ ); (b) correlation of the mean class satisfaction in eight general psychology classes with the mean achievement of those classes ( $N = 250$ ).

**RESULTS:** Achievement was significantly related to satisfaction with the self (.24) and dissatisfaction with other members of the class (−.33). The latter finding was verified in the advanced class (−.26) but not the former (.17). Gains in the major study were significantly related to satisfaction with: the role of the student (.41); the college (.37); and psychology (.36). There was no significant relationship between either achievement or gains and satisfaction with: the teacher (.08, −.01); the class activities (.11, −.05); the grading system (.15, −.03); or the sum of scores on all scales (.06, .02). However, the mean class satisfaction in the 8 sections was significantly related to their mean achievement ( $\rho = .73$ ).

**CONCLUSIONS:** Achievement was predicted as well from the attitude scales as from intelligence tests. Multiple  $R$ 's in the present study ranged from .50 to .61. Hypotheses regarding the relationship between attitudes and achievement will be presented.

**Smith, Orville A.** *see* Bakan, Paul

**Solomon, Paul** (*Myles Standish State School*), & **Rosenblatt, Bernard**. (*Worcester Youth Guidance Center*) **A developmental Rorschach study of 80 adult mental defectives.**

In another paper by the authors the Rorschach responses of adult mental defectives were examined from the point of view of structure. The modified location scores developed by Friedman were used for this purpose. This paper deals with other aspects of the Rorschach test, namely, form quality, the various movement and color responses, the content categories, and other factors usually associated with immaturity and the diagnosis of mental deficiency.

Eighty adult, institutionalized, familial mental defectives were Ss for the study. There were five groups of 16 Ss each. Subjects were placed in each group on the basis of Stanford-Binet IQ. The lowest group of 16 Ss had a mean mental age of 5 years, the highest group had a mean mental age of 12 years. Review of the literature leads us to believe that no investigators have, until now, collected a body of Rorschach data from as low a level of defective adults as our lowest group. The purpose of the study was first to examine perceptual functioning at various levels of mental deficiency, and, secondly, to compare this perceptual functioning with children of the same mental age.

Findings include the following: for all levels of mental deficiency, our sample shows extraordinary impoverishment and stereotypy, with determinants other than form being almost nonexistent. With increasing MA, however, *M*, *FM*, and *P%* show a steady increase. At all levels, Beck's *Hdx* or *Adx* or Rorschach's *Do* (oligophrenic detail) rarely appear. Comparison with children of the same MA shows many differences in perceptual functioning, especially with regard to form accuracy, stereotypy, and ideational activity. It is possible by means of the Rorschach to show that the immaturity of adult defectives is not equivalent to that of children with the same MA.

**Solomon, Paul** *see* Rosenblatt, Bernard

**Sontag, L. W.** *see* Baker, C. T.

**Souerwine, Andrew H.** (*Trinity College*) **The relationships between parents and sons on authoritarianism.**

**PROBLEM:** To determine what relationships exist between parents and sons on authoritarianism as indicated by an analysis of F-scale responses.

**SUBJECTS:** 53 college students and their parents (53 mothers and 49 fathers).

**METHOD:** The F scale was administered independently to the three groups of Ss. The responses were

subjected to the following analyses: Significance of differences between the means and product-moment correlation coefficients was computed for each of the groups on each of the following: total F scores, F subscores, and each of the 30 items on the F scale. In addition, interitem correlations were computed and correlation matrixes developed for each of the three groups. From the matrixes three separate cluster analyses were completed. Parents and sons were then compared on the basis of the final clusters.

**RESULTS AND CONCLUSIONS:** An analysis of distribution of total scores for the three groups shows that sons score significantly lower than do their parents. No significant differences exist between the parents. Evidence is given to suggest that these differences are a function of differences in education. On total scores, sons correlate significantly with mothers and not significantly with fathers; this is interpreted in terms of the predominant mother orientation of the American home. An item analysis of the F scale reveals that the mean item profiles of the three groups are very similar and that the differences between parents and sons can be attributed to specific items on the scale. Those items which differentiate fit, on the whole, into empirical clusters determined later in the analysis. The interitem correlation matrixes indicate that the F scale is not unidimensional. The cluster analysis points to several conclusions: (a) The hypothetical clusters suggested by the original California study are not borne out by empirical tests. (b) In some cases the clusters derived from the three samples show remarkable similarity; where comparisons can be made between clusters, parents tend to be similar and sons are related more to their mothers than to their fathers. (c) Some of the items fall into three different clusters, suggesting differences in interpretations of the items by the groups.

**Spangler, Donald** *see* Knopf, Irwin J.

**Spiegel, Joseph** *see* Tuckman, Jacob

**Spivack, George.** (*University of Pennsylvania*) **The functioning of a perceptual attitude, a need state, and their interaction in a size-constancy situation.** (Sponsor, Mortimer Garrison)

**PROBLEM:** This study was instituted to investigate the relationship between a perceptual attitude termed by Klein "tolerance vs. resistance to unstable fields" and behavior in a size-constancy situation. It was hypothesized that since the size-constancy situation calls forth processes directed toward stabilizing the perceptual field, differences in constancy performance under varying instructions and field conditions could be predicted from knowledge of people's characteristic



tolerances for field instability. It was also hypothesized that since motivation has been shown to alter perceptual judgments of need-relevant objects, a need state will have less effect on the judgments of people who are resistant to unstable or changing fields than people who are more tolerant of unstable fields.

**PROCEDURE:** Utilizing Klein's procedure, we defined tolerant people as individuals who perceive relatively wide ranges of phi movement, resistant people being those who perceive relatively narrow ranges of phi movement. Twenty undergraduates fit into each group. In a hungry state, all Ss judged the sizes of neutral and need-relevant stimuli at two distances and under the "look" and "bet" instructions of Singer.

**RESULTS:** (a) People characteristically resistant to unstable fields did not alter their constancy judgments as easily as people more tolerant of unstable fields despite instructions and field conditions demanding change. (b) Resistant people consistently gave significantly smaller size-constancy estimations than tolerant people. (c) Resistant and tolerant people behaved the same under the need conditions.

**CONCLUSIONS:** The results support the predictions for instructions and field conditions, but not for motivation. The findings are related to past constancy research and Klein's perceptual attitude. Suggestions are made concerning the functioning and significance of constancy perception in the total adjustment of the organism. The implications of the results to motivation research are discussed.

**Spragg, S. D. S.** see Gerall, A. A., Green, R. F.

**Stamm, John S.** (*California Institute of Technology*) **Effects of lesion of the median cortical surface on maternal behavior in rats.**

**PROBLEM:** It had been previously found that rats with lesions of the median cortical surface hoarded very little (*J. comp. physiol. Psychol.*, 1954, 47, 21-27). In order to obtain more information about the function of this cortical area, its role in maternal behavior patterns was investigated.

**PROCEDURE:** Albino rats that had previous litters were used. Bilateral lesions were applied to the median cortical surfaces of 9 rats (M group) and to the lateral cortical surfaces of 7 rats (L group). Seven unoperated females were used (C group). Rats were mated after recovery and placed in a two-compartment, wire-enclosed box prior to parturition. Paper strips were placed in one compartment for nest building, which was rated on a 6-point scale. During 3 successive days the nest was destroyed by an air blast and during the next 2 days the pups were exposed to strong heat for periods of 1 hr. Foster pups were introduced to keep the litter size constant.

**RESULTS:** (a) The mean size of the lesions was 15% and 13% for the M and L groups, respectively, and the mean lesion length was 77% and 72% of the cortical length. (b) The mean litter size was 9 live pups for rats in all groups. The M rats generally did not nurse the pups; 3 days after parturition the percentage of pups surviving was 9, 73, and 91, in the M, L, and C groups, respectively. (c) The M rats never built nests and their pups were scattered over the floor, whereas the L and C rats built excellent nests and kept the pups close together. (d) The foster pups, which had previous sucking experience, induced lactation in the rats with median lesions. During the fan and heat tests all rats moved most of their pups out of danger; the mean death rate per trial was 5.4, 3.0, and 0.4% of the litters of the M, L, and C groups, respectively.

It was concluded that the median cortical area controls nest-building behavior and the spontaneous care of newborn rats. (Slides)

**Stanley, Julian C.** (*Department of Education, University of Wisconsin*) **The 2 by 2 crossover or switchover (counterbalanced) design, with special reference to added complexities in Gellerman's study.**

Though replicated latin-square designs were discussed for psychologists as early as 1948, investigators comparing in counterbalanced order two tests or two forms of a test usually contrast the mean of all scores on one test or form with the mean of all scores on the other instrument by employing a simple *t* test for correlated means. Thus, they ignore order (AB vs. BA) and sequence (first test vs. second test) differences, lumping order with "differences between individuals within orders" and sequence with "individuals by days interaction within orders."

Gellerman introduced sex classification and matching across orders into the basic 2 by 2 crossover design, but his statistical analysis did not take account of these changes. Unfortunately, his Arthur Form I and II scores are no longer available. Therefore, the writer substituted scores from two forms of a locally constructed examination administered in counterbalanced order to 28 students. These are first analyzed in the standard way, including Tukey's test for non-additivity, and then the complications of Gellerman's design are simulated. This permits partitioning the sum of squares into nine (or eleven) components, with three (or four) different "error" terms, to show the procedure Gellerman should have used, but of course it does not check the accuracy of his inappropriate analysis directly.

Degrees of freedom for testing the "forms" difference dropped from 26 in the simple 2 by 2 crossover

design illustrated to 12. Biasing of the population sampled probably occurred in Gellerman's study when unmatched individuals were discarded. Also, to him the sex variable was of no interest. Matching vs. covariance vs. sheerly random assignment in this situation is discussed.

**Stechler, Gerald.** (*Yale University*) **Level of abstraction of concepts and level of stimulus complexity as related to concept attainment.** (Sponsor, Carl I. Hovland)

In some of Heidebreder's studies on concept attainment, level of abstraction (object, form, number) of a concept appears to be confounded with the number of irrelevant and interfering responses likely to occur to an "instance." Based on a theoretical model which predicts that rate of concept attainment is an inverse function of the number of irrelevant stimulus elements in the "instances" of the concept, the present experiment is designed to vary systematically both the level of abstraction of the concept and the number of extraneous elements included in an instance.

A  $3 \times 3$  factorial design was used to construct each list of stimuli. The nine stimuli in a list represent all combinations of (a) the three levels of concept abstraction, and (b) the three levels of stimulus complexity. Twenty-one college students each received eight such lists to learn by a method of successive paired-associate trials. For each *S* a given word was always paired with instances of the same concept. After learning the first list to a criterion, *Ss* were instructed to try to anticipate the word paired with a stimulus. At the end they were asked to verbalize the concept.

Based on a score of total correct anticipations for each concept, the results show significant differences at  $p < .01$  among both the levels of concept abstraction and the levels of stimulus complexity. Levels of stimulus complexity were significantly different in the predicted direction. Levels of concept abstraction differed in that number concepts were significantly more difficult than either object or form concepts. Between these latter levels of abstraction no significant differences were found. The implications of these findings will be discussed in relation to Heidebreder's hypothesis of "thing character." (Slides)

**Stein, Morris I.** *see* Rodgers, Robert R.

**Stern, E. Mark.** (*Columbia University*) **Affect in student teachers' evaluations of nursery school children.** (Sponsor, Joseph H. Britton)

**PROBLEM:** To determine (a) degree to which nursery school teachers' free choices of children on a sociometric test are influenced by personality characteristics of the teachers, and (b) components of child

behavior that are attractive to nursery school teachers.

**SUBJECTS:** (a) Undergraduate women registered in an advanced course in nursery school practicum in the College of Home Economics, Pennsylvania State University. (b) Two nursery school groups, one including 20 three-year-olds and another of 20 four-year-olds.

**PROCEDURE:** (a) Administration of the Guilford-Zimmerman Temperament Survey to the student teachers. (b) Administration of a "Guess-Who?" type sociometric test asking teachers to choose children who fit into categories related to profile scores on the temperament scale. (c) Rating of the children by three professional teachers familiar with them on the personality traits measured by the Guilford-Zimmerman Temperament Survey. (d) Analysis of results on the basis of percentage distributions and correlational type procedures.

**RESULTS:** Data are presented which show that teachers tended to like and identify with children who scored high on observable factors of emotional stability, thoughtfulness, objectivity, friendliness, and personal relations. They also tended to reject a greater number of children with low ratings on the above.

Little uniformity of choices was found on factors of general activity, ascendance, restraint, and sociability.

Correlational data fail to show statistically significant relationships between teachers' personality profiles and their choices of children.

**CONCLUSIONS:** These findings agree with studies of teacher choices of pupils in elementary schools, suggesting a tendency for teachers to reject children whose personalities offend established value systems. More subtle characteristics of child adjustment (general activity, ascendance, restraint, and sociability) apparently do not influence these teachers' judgments.

**Stevenson, Harold W., & Iscoe, Ira.** (*University of Texas*) **The effects of anxiety on complex discrimination learning.**

**PROBLEM:** The purpose was to investigate possible differences between high- and low-anxiety *Ss* in their ability to learn a series of discrimination problems where the solution of successive problems required *S* to shift from one response to another while the stimuli remained constant.

**SUBJECTS:** High- and low-anxiety groups of 25 *Ss* each were formed by selecting individuals with extreme scores on the Taylor anxiety scale.

**PROCEDURE:** The apparatus consisted of a form board and three square blocks. Mounted on each block was a square of different size ( $S_1, S_2, S_3$ ). The form board

contained three holes or positions ( $P_1$ ,  $P_2$ ,  $P_3$ ) into which the blocks could be fitted.

The task was to find a poker chip hidden by  $E$ . The placement of the poker chip was varied to create a series of six successive problems involving the discrimination of either size or position as the relevant cue for solution. Initially the poker chip was always under the middle-sized square ( $S_2$ ). After this discrimination was learned to a criterion of five consecutive correct responses, the second problem was immediately introduced without comment. On the second problem the poker chip was always in the first position ( $P_1$ ). The four remaining problems were introduced in the same manner. The correct cue for these problems was as follows:  $P_2$ ,  $S_2$ ,  $P_3$ ,  $S_1$ .

**RESULTS:** A significant difference in the rate of learning was found only on the first problem ( $S_2$ ), where the high-anxiety group required a mean of 24.9 and the low-anxiety group only 9.9 trials to learn the discrimination ( $.05 > p > .01$ ). On the five subsequent problems the performance of the two groups did not differ significantly. The ease of shifting from one response to another did not, therefore, differ significantly between the groups. The results are discussed in terms of alternative theories of the role of anxiety in learning. (Slides)

**Storms, Lowell H.** *see* Russell, Wallace A.

**Stotland, Ezra.** (*Research Center for Group Dynamics, University of Michigan*) **Peer groups and reactions to power figures.**

**PROBLEM:** To investigate an individual's reaction to a threatening power figure as affected by his membership in groups consisting of others who are also subjected to similar threats from other power figures.

**SUBJECTS:** 108 volunteers from various undergraduate courses.

**PROCEDURE:** A laboratory experiment was conducted in which  $S$ s used models to design a city while subject to the veto power of a superior who was a paid assistant. In the experimental condition, two such pairs of  $S$  and supervisor started to work on this town design in separate rooms. Their work was interrupted twice to allow  $S$ s to meet privately before returning to work with their respective supervisors. In the control condition, no such meetings occurred. In both conditions, the behavior of the supervisor was the same in all cases. The data were systematic observation of reactions to the supervisor, and of the  $S$ s' meetings, and postexperimental questionnaires.

**RESULTS AND CONCLUSIONS:** The general hypothesis was that the meetings of the subordinates would result in more aggressive and fewer withdrawing and cooperative reactions to the threatening power figure because of support for these reactions exchanged by

the subordinates. The results indicate that groups consisting of people subjected to threatening power tend to be supportive in nature. This support then leads the members to behave as individuals in a more aggressive, independent, and hostile manner toward the power figures. Without such supportive meetings, there is much more positive private evaluation and perception of the power figures, and more overt cooperation with them. Thus, the main hypothesis is supported by the data.

**Stovin, James J.** *see* Beck, Lloyd H.

**Strand, A. L., & Shurrager, P. S.** (*Illinois Institute of Technology*) **A continuous recording adaptometer, flicker photometer, continuous wave length monochromator for the study of human visibility.** (Sponsor, P. S. Shurrager)

An adaptometer has been designed and constructed around a continuous-recording experimental methodology. This instrument has a flexibility not found in available previously designed instruments for visual study and makes measurements possible which cannot be obtained on any other device we know.

Unique features of the instrument include: (a) continuous recording of dark-adaptation process by continuous adjustment of intensity; (b) continuous selection of any near-monochromatic or monochromatic region of the visible spectrum; (c) conversion to different energy distributions, such as equal energy, equal quanta, or equal visibility; (d) continuous adjustment of stimulus presentation rate and light-dark ratio; (e) monocular or binocular observation; (f) adjustment for spectral band width; (g) automatic time controlled adaptation field; (h) continuous selection of any visual angle within the limits of human vision; (i) ease of calibration from linear components; (j) elimination of experimenter error.

Records have been obtained for dark adaptation and the absolute threshold scotopic visibility curve of the rod region on four  $S$ s.

Continuously recorded dark-adaptation records have not been previously reported. The records thus far obtained show interesting consistent fluctuations and other characteristics that will be discussed.

Dark-adaptation records have also been obtained for different near-monochromatic portions of the spectrum. (Slides)

**Strang, Ruth.** (*Teachers College, Columbia University*) **Adolescents' views on aspects of their development.**

Personal documents may be used as research data to throw light on how individuals feel about themselves and others and how they perceive their life situations. One kind of personal document is the anon-



ymous, spontaneous compositions written in class by adolescents. The directions for writing these compositions invite introspection on a specified subject and frank, thoughtful, sincere response. Confidentiality is assured. Internal evidence of validity is the absence of obviously facetious remarks and the apparent interest and sincerity with which the compositions are written.

Over 2,000 compositions of this kind were obtained from adolescents of a wide range of ability and socioeconomic background in grades 7 through 12. The subjects on which they wrote included the following: when I felt disturbed—at a loss, all at sea; how I feel when I get my report card; how it feels to be growing up; what I like or dislike about teachers; what makes it hard to get along with my parents; what causes juvenile delinquency; how I feel when I am punished for something I did wrong; my problem of choosing a vocation; my reading autobiography; the kind of person I think I am, the kind of person others think I am, the kind of person I would like to become.

These data were treated so as to bring out commonality and individuality. Tabulation of ideas expressed in the compositions showed common problems, points of view, and feelings about important aspects of adolescent development. Excerpts from the compositions illustrated typical responses, idiosyncratic responses of individual adolescents under the conditions of writing the compositions, and vivid pictures of how they perceived certain situations such as getting a poor school report, having divorced parents, and not getting a date.

Despite criticism of introspective methods and the lack of correspondence between self estimates and the estimates of others, these personal documents seem to fill a gap in the present psychology of adolescence.

**Streitfeld, Hal S.** (*Stark County Guidance Center, Canton, Ohio*) **The specificity of two psychodynamic factors to peptic ulcer.**

**PROBLEM:** Ever since the initial work of Franz Alexander and his followers, numerous studies have been done in psychiatry, psychology, and psychosomatic medicine on the problem of specific psychological factors in peptic ulcer. These studies tend to concur in finding strong oral-dependent and oral-aggressive tendencies in ulcer cases. How specific these tendencies are to peptic ulcer is crucial to Alexander's theory of ulcer formation. Yet so far little research has been done on this specificity problem. This study was undertaken to inquire into the specificity of oral-dependent and oral-aggressive tendencies to peptic ulcer.

**SUBJECTS:** 20 cases of peptic ulcer (confirmed by X ray) and 20 cases of mixed nongastrointestinal

psychosomatic cases, such as bronchial asthma, rheumatoid arthritis, essential hypertension, etc. All of these cases were at least average in intelligence, of eighth grade or higher education, within the age range 20–45, and without psychosis.

**PROCEDURE:** A battery of psychological tests was administered and a brief psychosomatic history was taken. The two main instruments in this battery were the Rorschach and Blacky Pictures. A content analysis of the Rorschach was done according to De Vos's Affective Index, which includes dependency and hostility categories. The Blacky Pictures were scored by means of Blum's revised scoring system for research purposes. Contingency analyses were made of these data in terms of presence or absence of strong oral dependency and of strong oral aggression.

**RESULTS:** Group differences on oral dependency were not statistically significant. Group differences on oral aggression, though, were significant at the 2% level on the Blacky and Rorschach taken together. At least half of the control group scored strong on oral aggression. It was concluded that oral dependency does not have a specific relationship to peptic ulcer. However, some nonulcer psychosomatic cases manifest equally strong oral-aggressive tendencies.

**Stroud, John M.** *see* Craig, David R.

**Strupp, Hans H.** (*George Washington University*) **An objective study of certain psychotherapeutic operations: the effect of the therapist's personal analysis upon his verbal techniques.**

**PROBLEM:** Personal analysis is commonly considered one of the most important ingredients in the training of the psychotherapist. However, we have as yet little objective evidence concerning the effect of personal analysis upon therapeutic operations. The present study, which forms part of a larger project, attempts to investigate one aspect of this problem—the effect of personal analysis upon the therapist's verbal techniques. Specific hypotheses will be tested with respect to the handling of (a) near-psychotic patient productions; (b) suicide threats; and (c) other kinds of transference reactions.

**SUBJECTS:** 50 psychotherapists (mostly psychoanalytically oriented), including psychiatrists, psychologists, and psychiatric social workers. Thirty-six of the respondents had undergone personal analysis.

**PROCEDURE:** Each therapist was interviewed individually, and presented with 27 printed cards containing short paragraphs of statements made by patients in psychotherapy. Respondents were instructed to state what response, if any, they would make to the hypothetical patients. Background information was collected from each therapist.

**RESULTS AND CONCLUSIONS:** Therapists' responses numbering almost 2,000 were categorized by means of Bales's system of interaction process analysis. Rater agreement was found to be 78%. While comparisons between the responses of analyzed and unanalyzed therapists revealed large overlap, the latter group responded significantly more with silence and passive acceptance. In accordance with prediction, the unanalyzed group showed even greater passivity when dealing with near-psychotic productions. When responding to transference reactions, all therapists tended to give a larger number of interpretations—significant for the analyzed group at the .05 level of confidence. Contrary to expectations, both analyzed and unanalyzed therapists showed a slight tendency to offer more reassurance when faced with suicide threats.

The results are tentatively interpreted in terms of the analyzed therapists' greater sensitivity to the transference aspects of the therapeutic relationship. The marked difference along the passivity-activity vector is considered a provocative finding worthy of further investigation. (Slides)

**Summerskill, John. (Cornell University) Stimulus and observer variables in forming impressions of personality.**

The experiment was undertaken to determine relationships between reported impressions of personality and: (a) sex differences in observers, (b) sex differences in stimulus persons, (c) cue differences in stimulus presentation. Men and women Os were shown a male and female stimulus person in brief motion picture sequences. Stimulus persons spoke for 50% of the Os and were presented with the film sound track silent for 50% of the Os. Immediately following the film presentation, Os wrote out their impressions of the personalities and completed a questionnaire containing a trait check list and rating scales developed in preliminary research. Data were analyzed for samples of 100 men and 100 women Os equated on four extraneous variables.

Ninety-one per cent of the 112 items in the questionnaire showed a statistically significant difference attributable to the stimulus person variable, 77% to the stimulus cue variable, and 34% to the observer variable. Traits judged to be central or most descriptive of stimulus persons were not affected by presence or absence of auditory cues or the sex of Os. These variables produced significant differences in secondary or peripheral traits, i.e., modifications in the configuration of reported impressions. Differences were also demonstrated with respect to the length, amount of detail, and favorableness of impressions. Interac-

tion was consistently present so that effects due to sound cues were contingent upon O's sex and effects due to the observer variable were contingent upon the cues operative.

Results indicate that impressions were structured primarily by information available to all Os through the visual medium. Information available when auditory cues were present was somewhat different and this information was interpreted somewhat differently by men and women. Obtained differences in content of impressions suggest that Os assigned divergent meaning to behavior as a result of divergent understanding of sex roles. (Slides)

**Sweet, Alex L., & Silverthorn, Lee J., Jr. (University of Kansas) Temporal discrimination between visual stimuli of different intensities.**

**PROBLEM:** The purpose of this research was to determine whether differences in brightness of two flashes had an effect on the temporal appearance of the two lights. It could be predicted that the brighter light will appear to flash before the dimmer one. An additional problem was to determine, for varying brightness differences, the time values of this apparent temporal discrepancy.

**SUBJECTS:** 10 normal observers.

**PROCEDURE:** In general, two small adjacent lights were flashed and S had to judge which of the two lights appeared to flash first. The light sources were flash tubes controlled by special electronic equipment which could vary the interval of delay by which one light led the other.

The lights were 20 msec. in duration. Both flashes were well within the fovea (monocular).

Neutral density filters were used to vary the brightness. There were five conditions of intensity difference: no filter before either light (about 5,000 ft.-L), and filters reducing the brightness of one of the two flashes by log attenuation units of 0.5, 1.0, 2.0, and 3.0.

The psychophysical method of limits was used. The constant error for each S for each brightness condition was calculated indicating how much physical lead had to be given to one of the flashes in order for the two flashes to be seen at temporal equality.

**RESULTS AND CONCLUSIONS:** Analysis of the means of the 10 Ss showed that the dimmer flashes were perceived after the brighter ones. The comparative latency for the 0.5, 1.0, 2.0, and 3.0 log unit brightness difference was 4.5, 5.4, 7.0, and 13.7 msec., respectively. These constant errors, statistically, were reliably greater than zero. Moreover, there is an overall trend for an increase in comparative latency with an increase in brightness difference. (Slides)

Tagiuri, Renato, Kogan, Nathan, & Bruner, Jerome S. (*Harvard University*) **The transparency of interpersonal choice.**

Are the interpersonal preferences of members of a group known to the other members? This question was investigated on a group of 22 men. The method used yields information about the choices of each member as well as about each member's perception of the choices of the other members.

It was found that transparency—the extent to which a member's choices are known correctly by other members—significantly exceeded chance expectancy.

We next inquired into what might account for the differences in transparency among the group members. We could not account for differences in terms of a member's expansiveness or in terms of his confidence in being chosen by others. On the other hand, a positive relationship was observed between transparency and number of choices received by a member. Further analysis revealed, however, that this correlation between popularity and transparency could best be accounted for in terms of the extent to which a member's choices are reciprocated. Popular members tend to be more transparent because they have a larger number of reciprocated choices relative to the others. The greater transparency of the reciprocated choice may be understood if we consider reciprocity as providing the perceiver with a double source of choice cues, i.e., the manifestations of the member whose choice is to be identified, and the manifestations of choice on the part of the reciprocating member. While transparency has been shown to be in part a diadic phenomenon, we cannot dismiss the possible operation of personality factors not measured by us.

Tate, C. F. *see* Volkmann, John

Taulbee, Earl S. (*Norfolk State Hospital and the University of Nebraska College of Medicine*) **The use of the Rorschach test for evaluating the intellectual levels of functioning in schizophrenics.**

The present study was designed to investigate the value of the Rorschach test as an instrument for measuring the intellectual levels of functioning in schizophrenic patients, with the following hypotheses to be tested: (a) Rorschach scoring categories *R*, *Z*, *M*, *W*, and *F* + % will be significantly and positively correlated with Wechsler-Bellevue intelligence scores; (b) Rorschach scoring categories *R*, *Z*, *M*, *W*, and *F* + % when combined and weighted by the multiple-correlation technique will show a significant relationship with Wechsler-Bellevue intelligence scores and will be useful for predictive purposes; (c) clinical psychologists (diplomates in clinical psychology or

the equivalent in training and experience) can evaluate a Rorschach protocol and estimate, with a significant degree of accuracy, the mental efficiency of the individual in terms of the score obtained on the Wechsler-Bellevue Intelligence Scale; (d) psychologists' ratings will be more closely related to the obtained Wechsler-Bellevue intelligence scores than will the individual Rorschach scoring categories when considered collectively.

Sixty hospitalized schizophrenic patients, ranging in age from 20 to 39 years, were individually administered a Rorschach test and a Wechsler-Bellevue Intelligence Scale. Some of the purported Rorschach indices of intelligence were investigated by means of various statistical techniques. Also, each of 12 experienced clinical psychologists evaluated the Rorschach test protocols of 20 patients and estimated the intellectual level of functioning of each.

Statistical analyses of the findings failed to yield significant evidence to establish the validity of the Rorschach test as an instrument for estimating the intellectual levels of functioning in schizophrenic patients. The results indicate that the Rorschach scoring categories *R*, *Z*, *M*, *W*, and *F* + %, when considered individually or collectively, are not sufficiently reliable and do not afford an adequate measure of intelligence to be useful for prediction in individual cases. Also, because of interjudge variation in the ability to estimate intelligence scores from Rorschach records and because of interprotocol variation, neither quantitative nor qualitative estimates of intelligence should be made from the Rorschach test records of schizophrenics. Possible explanations of the findings are discussed and several suggestions for further research are offered.

Taylor, Franklin V., Kahn, A., & Birmingham, H. P. (*Naval Research Laboratory, Washington, D. C.*) **A demonstration of the effects of display quickening on multiple-coordinate tracking.**

**PROBLEM:** A remote or loose control-display relationship exists in many man-machine control loops as a result of physical processes that have the same effect as would integrators inserted in the system. It is hypothesized that this loose relationship imposes a drain on *S*'s attention and, thereby, limits the number of tasks that he can perform concurrently. Conversely, it is expected that *S* will be able to handle simultaneously more tasks if he is given better knowledge of the results of his control motions through display quickening.

**SUBJECTS:** Six unpracticed Naval enlisted men.

**PROCEDURE:** A four-coordinate, compensatory, visual tracking task was provided through the use of an



analogue computer. Three cascaded integrators were inserted in each tracking loop. The *S* manipulated two joy sticks to keep in view on a cathode ray tube two target dots, each of which was free to move in both *X* and *Y* coordinates. The *S*'s success in performing this four-coordinate control task with a quickened display (Condition A) was compared with his results when attempting to track in only one or two coordinates with no quickening (Conditions B and C). The three conditions were presented in random order, four trials per condition, to each *S* for 10 days. Each trial terminated at the end of two minutes. Scoring was in terms of length of time target was held.

**RESULTS:** (a) Five of the six *S*s tracked Condition A without loss of target from the second day on. (b) Some learning occurred with Condition B but only one *S* learned to control perfectly. (c) No *S* ever held the target throughout a trial with Condition C. The differences between conditions are statistically significant.

**CONCLUSIONS:** Display quickening increases markedly the number of control tasks that *S*s can carry on concurrently. (Slides)

**Taylor, Franklin V.** *see* Chernikoff, Rube

**Taylor, Irving A.** (*New York State College for Teachers, Albany*) **Perceptual closure and extreme social attitudes.** (Sponsor, Marie Jahoda)

The purpose of the research was to compare perceptual closure tendencies in extreme liberals, extreme conservatives, and intermediate groups. It was hypothesized that extremes would exhibit similar tendencies with regard to closing openings in reproducing configurations containing gaps, and that either extreme would exhibit a greater closure tendency than the intermediate group.

Two hundred and fifty-three *S*s were obtained from summer classes at the University of Houston in 1953. Most of the *S*s were male Protestants having a median age of 27.5 and an estimated parental yearly income of \$5,600. All college levels and practically all areas of study were represented.

Subjects were administered the 30-item California Fascism Scale, a social distance scale containing ten ethnic minority and ten authoritarian groups, and perceptual closure scales especially designed to yield an estimate of closure tendency. Subjects scoring in the low quarters on both the *F* scale and social distance scale were selected as extreme liberals, *S*s in the middle quarters as intermediates, and *S*s in the high quarters as extreme conservatives. Two scales were employed to increase the reliability of correctly identifying social attitudes, and the extracted group was termed the consistent sample.

The results confirmed the above hypotheses at a satisfactory level of confidence. In addition, curvilinear trends for the consistent sample were also apparent with regard to age, sex, and reported parental income. These results were not obtained when either the *F* scale or the social distance scale was separately analyzed.

The results were interpreted to support the contention that extreme social attitudes are genotypically similar even when phenotypically different, and that the utilization of a single instrument for estimating social attitudes may not yield the degree of accuracy necessary for the proper interpretation of results.

**Teitelbaum, Philip.** (*Johns Hopkins University*)

#### **Sensory control of hypothalamic hyperphagia.**

**PROBLEM:** A series of four experiments was performed to investigate the role of stimulus factors in the diet in regulating the food intake of normal rats and of rats made hyperphagic by hypothalamic lesions. The experiments tested the effects of caloric dilution and texture, and positive and negative taste qualities added to the diet on these animals.

**METHOD:** Six animals were used in each group (normal unoperated group, dynamic hyperphagic, and static hyperphagic group). Mean daily food intake was measured for five days on each diet.

**RESULTS:** 1. On standard Purina diet: static (obese) hyperphagic animals ate twice as much as normals; dynamic (nonobese) hyperphagics ate approximately three times as much as normals.

2. Caloric dilution. When standard diet was adulterated with nonnutritive cellulose: Normal animals increase intake up to 25% dilution; obese and dynamic hyperphagics steadily decrease their intake as a function of added cellulose; obese hyperphagics cease eating at 25% adulteration and beyond, whereas normal and dynamic hyperphagic animals maintain appreciable intake up to 75%.

3. Stimulus variation. Change in texture (grinding pellets to powder) causes obese animals to decrease their food intake, but does not affect normal animals and dynamic hyperphagics. Negative taste (quinine) yields exaggerated negative response in obese animals, making them quit eating, but does not affect normal or dynamic animals.

**CONCLUSIONS:** (a) Normal animals eat for calories and tend to ignore stimulus characteristics of diet over wide range. (b) Hyperphagic animals fail to adjust intake to caloric needs. (c) Obese hyperphagics show release from inhibition (exaggerated responses) to positive and negative stimuli in diet. (d) Dynamic hyperphagics differ from obese animals because they overeat heedlessly. This may be attributed to the difference in fat deposits. (Slides)

Teuber, H. L. *see* Weinstein, S.

Thorndike, Robert L. *see* Rosner, Benjamin

Thurston, John R. *see* Calden, George

Torgerson, Warren S. (*Social Science Research Council*) **A law of categorical judgment.**

This paper is concerned with those scaling methods in which an attempt is made to determine the scale values of a set of stimuli to within a linear transformation through use of ordinal judgments alone. The experimental procedures either require the subject to make paired comparisons judgments, to rank the stimuli, or to sort or rate the stimuli into a number of ordered (but not necessarily equal) categories or steps. These particular methods use the variability of judgment with respect to a given stimulus in obtaining the equal interval properties.

Four basic postulates underlying Thurstone's general case of the law of comparative judgment for paired comparisons data are given. An analogous general case of a law of categorical judgment for the rating and sorting procedures is then presented; it uses these same postulates plus an additional postulate that the category boundaries each project a normal distribution on the psychological continuum. The law of categorical judgment is an equation relating the scale values and variances of the stimuli, along with the locations and variances of the category boundaries, to the proportion of times any stimulus is sorted or rated below any category boundary. Given this law, three points of interest are noted. First, Thurstone and Saffir's method of successive intervals, Attneave's method of graded dichotomies, and Garner and Hake's equidiscriminability scaling procedure are all special cases of this general equation. Second, these earlier methods make an assumption of fixed category boundaries which is unnecessarily restricting. Third, several other new special cases of the law are given, one of which at least would appear to be of some practical value.

Torgoff, Irving *see* Sigel, Irving

Townsend, John C., & Bamford, Harold E. (*Basic Pilot Research Laboratory, AFPTRC, Goodfellow AFB*) **Evaluation of attitude-instrument-flying proficiency based on performance in a flight simulator.**

**PROBLEM:** To determine whether a student's attitude-instrument-flying proficiency may be evaluated in a flight simulator.

**SUBJECTS:** 32 student officers enrolled in the USAF Primary Pilot Training Program, all of whom had received 20 hours of instruction in attitude instrument flying.

**PROCEDURE:** Each S received one flight in each of two T-6 aircraft and one "flight" in each of two SNJ (T-6) electronic flight simulators. Performance was recorded by check-pilots in objective-type flight check booklets. A number of subjective-type ratings of the student's performance were also assigned during each check. The design of the experiment precluded any systematic effect of check-pilots, apparatus, weather, or order of conditions.

**RESULTS:** Estimated true-score correlation between flight and simulated flight performance is unity when based on an objective-type score and .93 when based on the subjective-type ratings. Validity of observed performance in simulated flight as a predictor of true performance in actual flight is estimated at .56 for the objective-type score, and .39 for the subjective-type ratings.

**CONCLUSIONS:** The results indicate that a pilot's attitude-instrument-flying proficiency may be evaluated on the basis of his performance in a flight simulator as adequately as on the basis of his performance in an airplane.

Trites, David K. (*USAF School of Aviation Medicine, Randolph AFB*) **Evaluation of assumptions underlying interpretations of sentence completion tests.**

**PROBLEM:** Interpretations of projective techniques frequently rest on unverified assumptions. This research evaluated two assumptions often inherent in interpretations of projective-type sentence completion tests.

**Assumption 1:** Responses given to incomplete-sentence stimulus items result from the manifest meaning of the items.

**Assumption 2:** A priori scoring systems which adequately reflect the meaning of responses may be developed by considering only the manifest meaning of the items.

**METHOD:** To obtain basic data, responses of 392 aviation cadets to a sentence completion test developed for use with Air Force pilot trainees were classified as indicating either positive or negative feeling tone. From this classification, interitem tetrachoric correlations were computed.

Independently of the first classification, the same responses were classified according to the 13 categories of a Basic Scoring Key constructed to represent areas of life experience and attitudes thought to be associated with the items.

Evaluation of the two assumptions was based upon a factor analysis of the item intercorrelations. Extracting factors capable of interpretation by reference to the manifest meaning of the incomplete-sentence stimulus items would support the first basic assumption, since to be interpretable at all, the factors must

be defined by items with similar meaning. Furthermore, if the majority of responses to items defining each factor were classified in categories of the Basic Scoring Key for responses having a meaning similar to the interpretation of the factor, then the second assumption would be supported.

**RESULTS:** Four centroid factors were extracted and "blindly" rotated to orthogonal simple structure. By consideration of items, the factors were found to be interpretable and to overlap extensively with categories of the Basic Scoring Key.

**CONCLUSIONS:** (a) Individuals do respond primarily to the manifest content of items in sentence completion tests. (b) It is possible to construct adequate a priori systems of response classification by considering only the manifest meaning of items.

**Trumbull, Richard.** (*Office of Naval Research*)  
**An analysis of arithmetic ability and ground-training performance of Naval Aviation Cadets.**

**PROBLEM:** The history of studies of various selection batteries and individual instruments as predictors of Naval Aviation ground-training performance is replete with evidence that demonstrated ability in arithmetic is the best predictor of success in that phase of training. This has been true for tests of arithmetic as units of a battery as well as for loadings of arithmetic materials scattered throughout composite test booklets. It was believed that a methodically constructed test of arithmetic, sampling addition, subtraction, multiplication, and division, would provide some answer as to the source of this relationship. Further, a means would be provided for determining levels of difficulty for various items and operations involved in their solution. From such analyses, an empirically developed test of items with established reliability would be used to maximize prediction of ground-training performance.

**SUBJECTS:** The study, including original determination of "level of difficulty" reliability through the validation of the ultimate form against the criterion of ground-training performance, involved over 1,000 Naval Aviation Cadets.

**RESULTS AND CONCLUSIONS:** Although Ss averaged over three years of college in educational history, items and operations of the simplest nature in addition, subtraction, multiplication, and division were found to be sources of error with high enough reliability to justify inclusion in the final prediction study. Correlations of variously derived test scores with ground-training final grade were significant at the 1% level of confidence or better in over 75% of the relationships studied. Interesting findings related to time required for completion (power test), se-

quence of test sections, contribution of algebra, and error potential of various arithmetic operations will be presented. The final test form developed by this procedure provides a discriminating addition to present selection batteries.

**Tryon, Robert C.** (*University of California*) **Dimensions of social structure from cluster analysis.**

Social class and majority-minority status are variables commonly believed to be primary characteristics of urban persons and groups. Quantitative data to support the view that these variables are indeed dimensions of social structure are scanty. The object of this study is to derive some of the dimensions of social structure as an integral part of a program to develop metric procedures of isolating urban social areas from cluster analysis. The data are 33 variables describing 243 neighborhoods (census tracts) comprising the San Francisco Bay Region in 1940. The variables state the potential probability of individuals' being stimulated in each neighborhood by features of the people, of their occupations, and of their homes. A neighborhood's probability pattern implies a matrix of social behavior of the people.

Our first procedure consists of a "cluster analysis of variables." Seven clusters of the 33 variables are isolated. A dimensional (factor) analysis reveals that three dimensions are necessary and sufficient to account for all the general variation among the 33 variables. The most independent three are interpreted as socioeconomic independence, assimilation, and family life. The first two are conceptually close to social class and ethnicity, respectively, but the third has generally no counterpart in current thinking about the social dimensions of personality.

The second procedure is a "cluster analysis of things," i.e., the process of putting together into larger groups, or "social areas," neighborhoods with similar patterns of scores on the three cluster dimensions. By this procedure eight such *general* social areas are discovered. They appear to remain stable over the socially disruptive decade 1940-50. It appears from our studies that these three cluster dimensions represent general, behavioral, and enduring variables of social life.

**Tucker, Ledyard R.** (*Princeton University and Educational Testing Service*) **A factor analysis method for critical experiments.**

Use of factor analytic techniques in more critical experimentation on mental traits has been limited by a lack of knowledge concerning the stability of results. Two sampling problems exist, one of sampling among individuals and a second of sampling among tests. The factor analysis method described here sup-



plies coefficients for judging the stability of results for each of the two types of sampling.

Consider a battery of tests so organized that it can be divided into two sub-batteries that are postulated to involve the same common factors. These two sub-batteries will be treated in a manner quite similar to canonical correlations. Instead of maximizing the between sub-battery correlation, however, the between sub-battery covariance is maximized. A normal vector of weights is applied to the tests in each sub-battery so that the covariance between the weighted composites for the two sub-batteries is a maximum. This procedure does not involve the test communalities. The weights defined in this manner have a peculiar property of being proportional to loadings on common factors. It is to be noted, however, that the factors for the two sub-batteries are differently rotated from any common frame between the two sub-batteries, and the rotation of axes to simple structure must be performed separately for the two sub-batteries.

A chi-square test for significance of successive factors extracted is available. In order to judge stability of sampling over tests, a correlation between factors determined for the two sub-batteries can be determined and used as a reliability type coefficient.

This factorial method has been tried on a battery of nine tests given to 710 individuals and involving the verbal and word fluency factors. The two factors were extremely significant as judged by chi squares of 700 and 300 for 8 and 6 *df*. Common factor reliability coefficients were approximately .90. It is concluded that these two factors can be identified with high stability of results.

This research was jointly supported by Princeton University and the Office of Naval Research under Contract N6 onr 270-20.

**Tuckman, Jacob, Lorge, Irving, Aikman, Louis, Spiegel, Joseph, & Moss, Gilda.** (*Institute of Psychological Research, Teachers College, Columbia University*) **Individual ability as a determinant of group superiority.**

**PROBLEM:** To estimate changes in the quality of solution by *ad hoc* teams whose members, as individuals, had solved the same practical field problem previously.

**SUBJECTS:** 70 cadets of the Air Force Reserve Officers Training Corps at Columbia College and Manhattan College, in Air Science I and Air Science II.

**PROCEDURE:** The Mined Road Problem was adapted for presentation at seven levels differing in remoteness from reality, from verbal description to actual real. At each form of presentation, ten individuals as individuals were set the task of solving and writing a solution to the problem. The five individuals who

had solved the problem as individuals in one afternoon were assembled as an *ad hoc* group to solve the same problem at the same presentation the following day. Data for 70 *ad hoc* groups who had solved the Mined Road Problem directly as groups were available for comparison.

**RESULTS:** (a) *Ad hoc* teams, re-solving as a group after its members had previously solved as individuals, make significantly better solutions than they had made as individuals. (b) There is no difference between the quality of the solutions by teams re-solving the problem and teams solving the problem as a team for the first time.

**CONCLUSIONS:** Although the superiority of the team solutions over the previously made individual solutions may be related to the greater amount and kinds of information about the problem among five members in comparison with any one, team superiority may be more a reflection of ability, i.e., the greater probability of getting an individual with a good solution in a team of *n* members.

**Tuckman, Jacob** *see* Lorge, Irving

**Turk, Elizabeth** *see* Lorr, Maurice

**Turner, Ralph H.** (*Oberlin College*) **The relative importance of selected status variables in the measurement of attitudes, behavior, and personal characteristics.**

The purpose of this paper is to explore the differential value of status variables in the measurement and analysis of certain kinds of attitude, behavior, and personal characteristics.

The Ss were 200 adult men and women over 21 years of age living in a medium-sized American city and were selected through the use of random numbers from a specified population universe.

Open-end interviews of 1¼- to 2½-hour duration were conducted in the home of each respondent. Verbatim replies were coded as to content and intensity of feeling. Chi-square analysis of the replies permitted the determination of the importance of each of these variables: age status, educational status, marital status, socioeconomic status, veteran status, and sex status. For each variable, high-low groups were chosen so that they were matched for all status variables except the one under examination.

More than 1,000 such status relationships were examined by means of chi-square analysis. Within the range of the behavior, attitudes, and personal characteristics examined here, the educational status variable had much greater differential value than any other status variable. The socioeconomic status variable was next in importance with the veteran status variable having the lowest differential value. Because

of the apparent importance of the educational and the socioeconomic status variables, particular attention is given to them.

The procedure followed permits analysis of each variable without contamination by the other, and certain relationships emerge. For example, there are a number of respects in which those at the higher educational levels are quite similar to those at the lower socioeconomic levels. The respects in which this similarity does not obtain point to rather significant attitudes and behavior peculiarly associated with higher educational status.

Twery, Raymond *see* Wrigley, Charles

Tye, Vermont M. *see* Dunn, Theodore F.

Uhlaner, Julius E. *see* Marks, Melvin R.

Valenstein, Elliot S. (*University of Kansas*) **The role of learning and androgen in the organization and display of sexual behavior in the male guinea pig.** (Sponsor, Walter Riss)

An investigation was undertaken to determine whether contact with other animals is necessary for the organization of sexual behavior of male guinea pigs. Animals from the highly inbred Strains 2 and 13 and a genetically heterogeneous stock were used.

Fourteen heterogeneous, 14 Strain 13, and 36 Strain 2 males were raised in social or isolated conditions. The social groups were kept with their mothers 25 days and with 5 females of the same age until day 73; the isolated animals were weaned at 25 days, then isolated. Seven weekly tests with females were begun on day 77.

Significant differences ( $p < .001$ ) were found between social and isolate Strain 2 animals. Only one isolate male intromitted and ejaculated, whereas 84% of the socially raised males did so consistently. Less marked but similar results were obtained with Strain 13 males. There were no significant differences between the social and isolate heterogeneous animals weaned at 25 days. However, when 20 social and isolate heterogeneous males were weaned at 10 days, highly significant differences were obtained.

After the above described tests, 24 social or isolate males of Strain 2 were castrated. After 10 weeks, when the animals had reached a base line of sexual activity, testosterone propionate was administered. Although large dosages were given (half received daily injections of 25 $\gamma$ /100 gm. body weight, and half 100 $\gamma$ /100 gm. body weight) only those males with previously organized sexual behavior had intromissions and ejaculations in subsequent tests.

It is concluded for the male guinea pig: (a) Contact with other animals is necessary for the organiza-

tion of sexual behavior. (b) The influence of contact may be exerted very early. (c) Effectiveness of androgen therapy depends upon whether sexual behavior had previously been organized.

Aided by grant M-504(C) from U. S. Public Health Service. (Slides)

Van Cott, Harold P. (*U. S. Naval Medical Research Laboratory*) **Amount of information as a determinant of the rate of response acquisition in a partial reinforcement situation.**

**PROBLEM:** S-R theory postulates the rate of response acquisition to be a function of the number of reinforcements administered during training. In situations where reinforcement is discontinuous, the ratio, number, and ordinal positions of reinforced items determine the orderliness (information) associated with a training schedule. The present study is an experimental investigation of the effect of the amount of information contained in partial reinforcement schedules on the rate of acquisition of a verbal response.

**SUBJECTS:** Six groups of 20 undergraduate college students, called Ia, Ib, IIa, IIb, IIIa, and IIIb, were used as Ss.

**PROCEDURE:** Ss were instructed to anticipate which one of two symbols, J or V, would occur on each of 120 successive trials. After each anticipation S was given a "correct outcome" (reinforcement) from a prearranged schedule.

While the ratio and number of J and V reinforcements within pairs I, II, and III were held constant, the amount of information varied with the length of trial blocks within which the correct ratio of J and V outcomes was disturbed. Groups Ia and Ib learned under a ratio of 4:5 (80%), with the ratio maintained in blocks of 5 trials for Ia and in blocks of 15 trials for Ib. Groups IIa and IIb learned under a ratio of 3:4 (75%), with the reinforcement ratio maintained in blocks of 4 and 12 trials respectively. Groups IIIa and IIIb learned under a ratio of 3:5 (60%), with the ratio maintained in blocks of 5 and 12 trials respectively. Under these conditions the amount of information in bits per trial varied from .464 for Ia to .819 for IIIb.

**RESULTS:** If, on any trial, S guessed the J symbol, the response was called positive. A guess of V on any given trial was called negative.

At the beginning of training all groups emitted between 45 and 50 per cent positive responses. After the first twelve trials the rates of responding of all groups gradually approached the training series of positive trials as an asymptote, with the slopes of the acquisition curves as follows: Ia: 1.25, Ib: .82, IIa: 1.00, IIb: .51, IIIa: .19, and IIIb: .14.

Using an analysis of variance for repeated measurements on the same Ss, the rates of acquisition for the six groups were significantly different at the .001 per cent level.

Differences in rates of acquisition between pairs of groups operating under equal number of reinforcement but different amounts of information were significant at the .001 per cent level for Ia and Ib and IIa and IIb and at the .01 per cent level for IIIa and IIIb.

The rates of acquisition of the groups varied as a positive function of the number of reinforcements administered during training and as a negative function of the average amount of information associated with the training schedules.

CONCLUSIONS: Response acquisition is not solely a function of the number of reinforced S-R connections but also of the organization of the events composing the training schedule. The latter variable determines the utility of emitting a response by virtue of information derived from previous trials. (Slides)

Vaughan, Willard *see* McGinnies, Elliott

Verplanck, William S. (*Harvard University*)

**Sequences of guesses between two alternatives as a function of the probability of the alternatives.**

PROBLEM: To evaluate the probability of guessing alternative A, when the probability of the event A, whose occurrence is being guessed, varies; to evaluate sequential dependencies between such guesses.

SUBJECTS: 417 Indiana University students.

PROCEDURE: 417 Ss made series of 20 choices between two alternatives under each of 9 conditions. Each guess was recorded by S on an IBM sheet. In one series, objective probability was indeterminate; in four, one coin was flipped so that  $p$  was .50; in two,  $p$  was .25; in two, .125; and in one, .875. In all series but one of  $p = .50$ , the intertrial interval was 8 sec.; in this it averaged 2 sec. In all but one series each of  $p = .50$ , .25, and .125, S could not see his record of previous responses.

RESULTS: Probabilities of response varied with probability of events: S's mean guesses of events of probabilities .875, .500, .250, and .125, were .764, .503, .348, and .211, under comparable conditions. Short intertrial interval and visible marks of previous responses produced small but significant differences.

The Ss tended to alternate rather than to repeat responses. This effect is larger at the beginning of a series. It is smaller when S can see his record of previous responses. Measures of information based on the choices of human subjects are compared with those of theoretical unbiased and biased coin flips.

CONCLUSIONS: Ss tend to avoid repetition in making guesses on the occurrence of events whose theoretical probability can be computed. This result is not in keeping with the hypothesis that such guessing habits account for the response dependencies found in measurements of visual thresholds. (Slides)

Volkman, John, & Tate, C. F. (*Mount Holyoke College*) **The quantal discrimination of visual position and its improvement with practice.**

PROBLEM: (a) Quantal discrimination has not been previously demonstrated in vision. Can it be demonstrated for a particular visual aspect, namely position? (b) Will this discrimination improve with practice? (c) If it does, how can the improvement be reconciled with the limits of performance imposed by quantal discrimination?

SUBJECTS: Four female undergraduates, serving in a group, made some 10,000 judgments on 10 different days.

METHOD: The experiment employed a two-category temporal forced-choice method, similar to Blackwell's. The Ss viewed a 1.5-mm. bright spot at 30 ft. The spot appeared for 2.0 sec. It made an abrupt movement, whose amplitude was accurately set at one of 13 different values. The Ss reported whether the movement occurred in the first half of the exposure or the second.

RESULTS: The curves show percentage of judgments correct plotted against stimulus amplitude. No S provided homogeneous data: all Ss improved with practice, even without explicit differential reinforcement. Fortunately, large fractions of the data yielded regular, interpretable functions. These are mainly not sigmoid; they appear to be composed of straight-line segments, rather than one smooth curve.

In the first part of the experiment, S No. 1's function shows first-quantum discrimination, with a quantal unit of 0.175 in. (1' 40" of visual angle). In the last part, this S's function shows a quantum of about  $\frac{1}{2}$  that size, and a complex shape, previously described by Miller and Garner. The other Ss all gave evidence of the smaller-sized quantum and an increasing frequency of its use.

CONCLUSIONS: (a) There is evidence for the quantal discrimination of visual position. (b) The discrimination is improved by practice. The paradox of improvement on the one hand, and quantal limits on the other, can be resolved: the Ss shift from a relatively large quantal unit to a much smaller one.

Wagner, Mazie Earle *see* Schubert, Herman J. P.

Wands, Herbert *see* Cottle, William C.



**Wapner, Seymour, & Werner, Heinz.** (*Clark University*) Gestalt laws of organization and organismic theory of perception: effect of asymmetry induced by the factor of similarity on the position of the apparent median plane.

**PROBLEM:** It was hypothesized that the organizational factor of similarity influences the position of the apparent median plane, i.e., "straight-ahead."

**SUBJECTS:** 16 men and 16 women.

**PROCEDURE:** Each test configuration used was composed of three 20-cm. luminous squares placed next to each other. The squares were ground glass front faces of light boxes on which were pasted strips of tape so that in darkness a pattern was produced on each square consisting of horizontal (or vertical) parallel lines. The emitted light was either green or red, equated for brightness. By this means 8 configurations were produced. Each configuration, composed of three squares, had the property that two adjacent squares were similar in both the color and the direction of the lines (dual pattern). In half of the configurations the dual patterns were on the left, and the other half on the right.

The center of the three-square configuration was initially placed in the objective median plane. The task for *S* was to fixate the center of the configuration and to instruct *E* to move the configuration along a track horizontally in the frontoparallel plane so that the center appeared straight ahead to *S*. A combined factorial and replicated  $8 \times 8$  latin-square design was used. Two men and 2 women were tested in each of the 8 sequences.

**RESULTS AND CONCLUSIONS:** The position of the apparent median plane shifts relatively toward the side of the dual pattern, i.e., to the side to which the similar squares of the three square configuration are located ( $p < .01$ ).

Experiments on another dimension of space, viz., the horizon, will be briefly mentioned where analogous effects have been obtained.

This experiment provides the basis for incorporating into an organismic theory the laws of organization, previously described only in phenomenological terms by gestalt theory. (Slides)

**Warren, Martha H.** *see* Helson, Harry

**Waxenberg, Sheldon E.** (*Mount Sinai Hospital*) Psychosomatic patients and other physically ill persons: a comparative study.

**PROBLEM:** To investigate certain psychological hypotheses about patients with psychosomatic diseases.

**SUBJECTS AND METHOD:** An experimental group of 20 asthmatic women, another group of 20 women with histories of ulcerative colitis, and a nonpsycho-

somatic control group of 20 women being treated for malignant tumors were given a test battery including a screening vocabulary test, Bender-Gestalt test, Rorschach, figure drawings, word associations, and ten TAT cards. All *Ss* were between 23 and 46 years old and were screened to eliminate those with multiple diseases.

**RESULTS:** (a) Bender-Gestalt scores gave no evidence that psychosomatic patients more closely resemble psychiatric patients in general adjustment than do other sick people. (b) TAT mood scores gave no indication that psychosomatic patients are more subject to dysphoria than other physically ill persons. (c) Rorschach records revealed no significant evidence that psychosomatic patients are more likely to (i) give coarctated records, (ii) give fewer human movement responses, (iii) obtain higher weighted color sums, (iv) produce static human movement responses, or (v) produce bony anatomy responses than are others physically as ill as they are. (d) The sex sequence of the two human figure drawings and their relative size offered no evidence of differences in the psychosexual identifications of women with asthma and women with ulcerative colitis. (e) No evidence was derived from Rorschach content or word associations to indicate that asthmatics are inordinately concerned with thoughts of oral satisfactions or deprivations or that colitis sufferers are principally preoccupied with excretory functions or their indirect, symbolic counterparts. (f) Rorschach movement responses did not reveal a significant tendency for asthmatics to project their passivity and dependency needs in their fantasy productions or for colitis subjects to project mainly strivings and aggressive drives.

**CONCLUSIONS:** The meaning and possible sources of the consistently negative findings were discussed and their implications for theory and research were examined.

**Webb, Sam C.** (*Emory University*) Relevance of scale and ambiguity values for constructing Guttman-type scales.

The purpose of this study was to investigate the interrelationships among various indices of the Thurstone, Likert, and Guttman scaling techniques with the aim of assessing the relative importance of the Thurstone- and Likert-type values for selecting items which will be scalable according to the Guttman criteria. The specific indices studied were scale values, ambiguity values, discrimination values, and a cutting-point index. This last named index is in effect the marginal total for a dichotomized item.

**PROCEDURE:** With the Thurstone and Chave items of attitude toward the church, scale and ambiguity values

were computed on the basis of data collected by the method of equal-appearing intervals from 100 Georgia Institute of Technology students. Discrimination and cutting-point indices were computed on the basis of data collected by the Likert technique from 304 students of the Atlanta Division of the University of Georgia. Intercorrelations among these various indices were determined. Since several of the relationships were curvilinear, all coefficients were reported in terms of  $\chi^2$ .

**RESULTS:** The results showed an insignificant relation of discrimination value and cutting-point index on ambiguity value, a significant but fairly low relation of discrimination values on cutting-point indices and scale values, a moderately high relation of scale value on ambiguity value, and a high relation of cutting point on scale values.

**CONCLUSION:** It is inferred that scale and ambiguity values contribute little over and above what is contributed by discrimination and cutting-point indices toward the selection of a set of attitude items that will have a high potentiality of scaling according to the Guttman criteria.

**Webb, Wilse B.** (*U. S. Naval School of Aviation Medicine*), & **Malt, Ronald.** (*Harvard Medical School*) **Pseudo conditioning of the response to electroconvulsant shock in humans.**

When the use of the convulsant response in electroconvulsant shock therapy (EST) as an unconditioned response in classical conditioning research was explored, clear-cut evidence of pseudo conditioning was obtained. The data are presented for their implications in the use of this response for classical conditioning and the theoretical implications for classical conditioning and electroconvulsant shock therapy.

Eight Ss were used: two normal females, two psychotic females with no previous EST, two psychotic females with one or two EST sessions, and two psychotic females with 46 EST on 38 EST sessions.

The conditioned stimulus was an aperiodic buzzer. The unconditioned stimulus was electric impulse of 300-500 Ma. for 1 sec. across the cerebral region. The responses measured were a pneumatic response and a foot flexion. The conditioned stimulus was to precede the unconditioned stimulus by .5 sec.

The conditioned stimulus was presented to Ss without the unconditioned stimulus. Responses comparable in character and in time to the comparative records of the unconditioned response to shock itself were obtained in the two patients having previously received a large number of electroconvulsant shock treatments. These patients represented Ss to whom the unconditioned stimulus had been presented a large

number of times in absence of the conditioned stimulus. No comparable responses were obtained to the presentation of the conditioned stimulus alone in all other Ss.

It was concluded that evidence of pseudo conditioning was obtained. These results are discussed from the point of view of the classical conditioning and electroconvulsant therapy. (Slides)

**Weinberg, Joseph A.** *see* Seymour, Charlyne T. Stormont

**Weininger, Otto.** (*University of Toronto*) **Organic change under emotional stress as a function of early experience.** (Sponsor, E. W. Bovard, Jr.)

**PROBLEM:** To determine the effects of early handling of the male albino rat on: (a) cardiovascular, gastrointestinal, and endocrine damage under emotional stress as adult; (b) emotionality in an open field; (c) body weight.

**SUBJECTS:** Male albino rats, Wistar strain.

**DESIGN:** a. Immediately after weaning (21 days) 32 rats were sorted into 16 pairs matched for weight, and were pair-fed for 36 days. One animal in each pair was gentled 10 min. a day following weaning for 21 days. At the end of this period, a check showed the weights of nongentled and gentled animals to be approximately the same. At 59 days of age, 7 pairs were randomly selected and sacrificed (one pair was discarded). Comparison of adrenal weights of gentled and nongentled animals revealed no significant difference. The remaining 8 pairs were subjected to 48 hr. of immobilization and food and water deprivation. Autopsy showed significantly heavier adrenals ( $p < .01$ ); significantly more bleeding points in the stomach ( $p < .01$ ); and more heart damage for the nongentled.

b. In a second experiment, 20 albino rats were randomly sorted into two groups following weaning. Experimental animals were gentled for 21 days and fed ad libitum. At 64 days of age all animals were introduced singly into the open field for 10 trials. Gentled animals showed significantly more activity ( $p < .0001$ ) and less thigmotaxis.

c. In the third study, 20 male albino rats were sorted into 10 pairs matched for weight and fed ad libitum. Experimental animals were gentled for 21 days following weaning, during which time weights of the food intake and faecal boluses were recorded. Results indicate that the gentled and nongentled animals ate the same amount of food, but that the gentled gained significantly more weight ( $p < .001$ ), and that the nongentled excreted a greater weight of faecal boluses ( $p < .001$ ). (Slides)

Weinstein, Edwin A., & Kahn, Robert L. (*Mount Sinai Hospital and Army Medical Service Graduate School*) The adaptive role of behavior accompanying brain disease as exemplified by the phenomena of reduplication. (Sponsor, Robert L. Kahn)

Many aspects of the behavior of patients with brain disease are not explicable in terms of a loss of some psychological faculty or of a disruption of some physiological or perceptual mechanism. A more productive approach lies in the recognition that one is observing the adaptation of the patient in a particular environmental situation. This includes not only the neural organization but the patient's disability, motivations, and past experiences, and the hospital milieu. The phenomena of reduplication are examples of a pattern of behavior resulting from the interaction of such a multifactorial system.

Reduplicative delusions for place, person, time, and parts of the body have been observed. In these delusions, the patient confabulates the existence of two or more places, persons, temporal experiences, or parts of the body with almost identical attributes although only one exists in reality. Thus, a patient might say there were two Walter Reed Hospitals, that he had two sons when he really had only one, that he knew the examiner from some time in the past, or that he had two heads or two left arms. In each instance the reduplicative delusion served as a framework in which a denial or minimization of illness was expressed. These patients rarely showed overt anxiety or "catastrophic reaction."

Testing showed that the phenomena were unrelated to the degree of sensory disturbance or memory defect, contrary to the explanations previously advanced (Bechterev, Pick). A necessary factor, however, was a pathological condition which by reason of rapid growth, mid-line position, diffuseness, multiplicity or association with increased intracranial pressure or subarachnoid bleeding produced a diffuse slow wave electroencephalographic record. Reduplicative mechanisms may also be noted in transient fashion in persons without structural damage, as in the *déjà vu* experience and the imaginary companions of children.

Weinstein, Edwin A. *see* Kahn, Robert L.

Weinstein, Meyer, & Fitts, Paul M. (*Ohio State University*) A quantitative study of the role of stimulus complexity in visual pattern discrimination.

**PROBLEM:** The applicability of information theory to the prediction of the discriminability of visual forms was investigated. Specifically, the time to identify designated figures was determined as a function of

(a) stimulus complexity, defined as bits per figure, and (b) the size of the sample of similar figures from which the discrimination was made.

**SUBJECTS:** Nine college students.

**STIMULUS PATTERNS:** Stimulus patterns were constructed, using  $4 \times 4$ ,  $6 \times 6$ , and  $8 \times 8$  matrices, by blackening cells in the columns of each matrix. The height of each column was determined randomly and independently, resulting in the generation of figures of three degrees of complexity, 8, 15.5, and 24 bits respectively.

**PROCEDURE:** Practiced Ss were shown a figure, and the time required to locate it in a row of similar figures was determined. Each S was tested repeatedly under three levels of complexity and three row lengths (4, 8, and 16 figures per row).

**RESULTS:** Both experimental variables and row length, and their interaction, were significant at the  $< .001$  level. The data for all nine experimental conditions are fitted by the equation

$$T = 0.49 + 0.047X$$

where  $T$  = average time per figures in seconds and  $X$  = bits per figure detail times row length.

**CONCLUSIONS:** The time required to identify a figure is a function not only of the unique configuration of that figure, but of the size of both the immediate and the hypothetical population of which it is a member. It is significant that time was a function not of the information required to specify a complete figure, but of the average information in a single detail.

This research was supported in part by the Office of Naval Research. (Slides)

Weinstein, S., Semmes, Josephine, Ghent, Lila, & Teuber, H. L. (*New York University, Bellevue Medical Center*) Spatial orientation in man after cerebral injury.

Recent work has established that penetrating trauma to parietal lobe in man produces lasting disturbance in spatial orientation, as evaluated by route-finding tasks (Semmes, Weinstein, Ghent, Teuber). The present study attempts to define the nature of this deficit by searching for relationships with other alterations in function.

Sixty-three men with penetrating cerebral trauma, and 20 controls, were required to follow, by locomotion, routes represented on maps. Five of these maps were perceived visually; the remaining ten, five for each hand, were perceived by touch alone.

Previous work (Semmes *et al.*) had already shown that performance of men with parietal lesions is significantly inferior to all other men with brain injury, and to controls, regardless of visual or tactual presentation of maps. Our present work showed fur-



ther that presence or absence of visual field defects had no influence on the outcome of the tests.

By contrast, each of the following three symptoms was positively associated (jointly and separately) with defective spatial orientation: (a) aphasia: aphasics did significantly worse than nonaphasics, and both were surpassed by controls; (b) epilepsy: epileptics did worse than nonepileptic brain-injured and both did worse than controls; (c) somatosensory impairment: men with defective tactual two-point discrimination performed significantly worse than men with other somatosensory deficits, who in turn fell significantly below controls and brain-injured without somatosensory impairment. Nevertheless, impairment on the orientation tests in these men was not due simply to inability to perceive the task by touch since they did equally poorly on the visual maps.

In conclusion, spatial orientation assessed by route-finding tests in man is dependent on integrity of parietal lobes, and most easily disturbed by lesions which tend to implicate certain aspects of language and somatosensory function. (Slides)

**Weiss, Bernard.** (*University of Rochester*) **Pressure variation, the range effect, and the accuracy of positioning responses.**

In an earlier study on factors affecting the accuracy of positioning a joy stick type control, pressure variation was found to produce no significant differences in accuracy, while increases in distance moved decreased relative error. Furthermore, these differences arose mostly from the shortest settings within a displacement range, a phenomenon closely resembling the "range effect." The task required S to make his adjustment after the initial visual cues were withdrawn.

The present study was an attempt to obtain more information about the effects of pressure variation at the smaller displacement ranges and to explore the role of the range effect in this situation. Four maximum pressures were used with one maximum displacement. Data for each of these four conditions were obtained in two ways. In one, the sequence of displacements, as in the earlier study, was essentially random. In the other, S made a series of alignments all of the same size. It was assumed that the latter procedure would attenuate the range effect. Each of the eight Ss performed on all conditions.

The results (for both series) indicate that in this task pressure variation has no effect on the accuracy of positioning responses, even with relatively short displacements. As in the earlier experiment, the mixed series of displacements led to the greatest error and the greatest variability at the shortest displacements within a range. With the constant series, the pattern of error was quite different, for it was not con-

centrated at the shortest displacements. The error also tended to be less in absolute size. The variability, however, followed a trend similar to that observed with the mixed series, although the absolute values were smaller.

This experiment was carried out as part of a program of research on motor performance sponsored by Special Devices Center, Office of Naval Research. (Slides)

**Weiss, Robert S.** (*Survey Research Center, University of Michigan*) **Factors determining the adoption of decision making as a role behavior: a study of scientists in a government organization.**

**PROBLEM:** To study the processes by which role behaviors come to be adopted by members of an organization.

**SOURCE OF DATA:** Interviews with each of 63 scientists employed by a government organization regarding their job activities and their attitudes in a number of areas.

**RESULTS:** Two factors were found to account for whether the individual reported decision-making activity: his supervisor's attitude toward decision making by subordinates, and whether the individual possessed "legitimizing characteristics," i.e., characteristics which seemed to make it proper that he make policy decisions. These characteristics were, in order of importance, educational attainment, several years of service in the organization, and a great deal of experience in the field.

Where the supervisor retained decision-making power himself, decision making was reported by only those subordinates who not only had legitimizing characteristics, but also had developed techniques for restructuring their jobs within a framework imposed by their supervisor. Where the supervisor allowed decision making by subordinates without requiring it of them, no individual without legitimizing characteristics reported decision making, and almost all individuals with legitimizing characteristics reported decision making. Where the supervisor required decision-making activity of his subordinates, all subordinates reported decision making, but one subordinate, who did not have legitimizing characteristics, was extremely insecure in regard to his job performance.

**CONCLUSION:** Legitimizing characteristics are used as a basis for shared evaluations of the competence of the scientist to make policy decisions. The supervisor who allows decision making by subordinates provides a social setting within which these shared evaluations will determine which scientists will make policy decisions. Where the supervisor requires that his subordinates make policy decisions, legitimizing

characteristics are important to the scientist in that they justify to himself and others his decision-making role.

Welkowitz, J. *see* Ausubel, D. P.

Wendahl, Ronald *see* Ax, Albert F.

Werner, Heinz *see* Wapner, Seymour

Wertheimer, Michael. (*Wesleyan University*)

**Figural aftereffects in schizophrenic and normal subjects.**

Individual differences in the size of figural aftereffects could be interpreted to imply individual differences in cortical conductivity and hence in metabolic efficiency. Since they are on the average metabolically less efficient, schizophrenics should exhibit smaller figural aftereffects than do normals.

Subjects used: 15 schizophrenic and 15 normal males in a first study at Worcester State Hospital, and 17 schizophrenic and 17 normal males in a second study at Rockland State Hospital.

The first study used one of Köhler and Wallach's visual figural aftereffect demonstrations. The *S* was shown the *I* pattern, then briefly the *T* pattern. Size of aftereffect was obtained by noting which one of a graded series of more or less distorted replicas *S* chose as most similar to the *T* pattern.

The second study used the same technique with a shorter inspection period, a modification of Köhler and Dinnerstein's technique for measuring kinesthetic figural aftereffects, and a second technique for measuring visual figural aftereffects, in which *S* adjusted a vertical line so that it looked just as far to the right of a fixation point as a stationary vertical line was to the left of the point, before and after presentation of an *I* pattern, which consisted of a vertical rectangle falling retinally between where the fixation point and the left line fell.

In all comparisons, schizophrenics exhibited significantly smaller figural aftereffects than did the normal controls. This difference was significant at the .01 level for the first visual technique in both studies, at the .01 level for the kinesthetic technique, and at the .05 level for the second visual technique.

The present data indicate that schizophrenics exhibit smaller figural aftereffects than do normal subjects. This result gives support to the metabolic efficiency hypothesis. (Slides)

Wertheimer, Rita R. (*West Virginia University*)

**Rorschach signs of adjustment and their relationship to adolescent sociometric status, socioeconomic level, and sex.**

PROBLEM: Do significant differences exist among adolescents in Rorschach signs of adjustment as a

function of (a) sociometric status, (b) socioeconomic level, or (c) sex?

SUBJECTS AND PROCEDURE: Sociometric procedure involved the construction and administration of a near-sociometric questionnaire to the tenth, eleventh, and twelfth grade students in two high schools. The *Ss* were asked to name students in their homeroom group as preferred companions in each of several sociometric choice situations. To evaluate the statistical significance of each person's total sociometric choice frequency, Bronfenbrenner's deviation from chance expectancy approach was used. To be included in the accepted or rejected groups, a statistically significant high or low total choice frequency was necessary. Socioeconomic-level evaluation consisted of rating fathers' occupations on a social prestige scale of occupations by two judges, with 89 per cent agreement on the ratings.

From this pool 200 *Ss* were assigned to one of 12 subgroups in terms of sex, sociometric status, and socioeconomic level in such a way that each subgroup did not differ significantly from any other in mean age, grade, or intelligence level. The 12 subgroups included three levels of socioeconomic status (high, middle, and low), two groupings for sociometric status (accepted and rejected), and two for the male and female classification. The group Rorschach was administered, and the data analyzed for Davidson's signs of adjustment. The total number of signs was that *S's* "score." To evaluate Rorschach scoring accuracy, 20 protocols were independently rescored, with a percentage agreement of 90 between the two scorers. Individual Rorschachs were obtained on a proportion of the *Ss*, and the incidence of adjustment signs under the differing administration techniques compared.

RESULTS: In view of the symmetrical distribution of signs in this study, the analysis of variance procedure was used in the data analysis. No significant differences were found to exist in adolescent adjustment (as defined by the criteria Rorschach adjustment signs) as a function of sex, sociometric status, or socioeconomic level.

Weschler, Irving R., & Shepherd, Clovis. (*Human Relations Research Group, Institute of Industrial Relations, University of California, Los Angeles*)  
**Organizational structure, sociometric choice, and communication effectiveness: a pilot study.**

PROBLEM: In most formal organizations, considerable difficulties arise in the manner in which organizational objectives are originally determined, transmitted, understood, and attained. These difficulties can often be traced to failures in the communications process

involving the following variables: the people concerned (communicators and interpreters), the content, the media, and the specific situations in which communications occur. This longitudinal study was designed to isolate the key factors that influenced communication effectiveness in an ongoing situation, characterized by a definite organizational task that required cooperative action by various subgroups, a clearly defined time span, and a criterion of organizational effectiveness (i.e., task failure).

**SUBJECTS:** 15 members of a naval research laboratory, organized in four subgroups, engaged in a series of tests on ordnance equipment.

**PROCEDURES:** Intensive interviews were conducted with all participants to determine varying perceptions concerning interpersonal relations with reference to the task. Specific questions yielded information on organizational structure, formal and informal relations, availability of channels, nature of communication difficulties, and the like. A sociometric questionnaire, patterned after the Multi-relational Sociometric Survey (MSS) was administered to provide data about the organizational structure and affective work-oriented relations among Ss. Two kinds of communication difficulties—expressed (as stated by the respondents) and inferred (as judged from discrepancies in response)—serve as criteria of communication effectiveness.

**FINDINGS:** Expressed communication difficulties, within and between subgroups, appeared to be related to breakdowns in organization structure, as determined through low MSS indices of understanding, conformity, and satisfaction. Expressed communication difficulties between individuals were related to affective choice between individuals, though not always in the expected direction. Implications of these discrepancies will be discussed. Expressed communication difficulties served as useful predictors for inferred communication difficulties.

**Wiener, Morton.** (*Carter Memorial Hospital, Indianapolis*) **Meaning as a variable in perceptual behavior.**

**PROBLEM:** Two opposing hypotheses have been proposed to account for differential perceptual thresholds for words. One maintains that in addition to structural determinants, motivational factors operate selectively in determining perceptual behavior; implicit is the concept of "meaning" of the stimulus word. The other maintains that structural determinants alone, particularly word frequency, can account for experimental findings. These hypotheses can be tested directly by measuring thresholds of words having two meanings, one threat, one neutral. Here, frequency and configuration are identical but meaning varies.

**PROCEDURE:** 25 male adults were randomly distributed into two groups: A, neutral,  $N = 17$ ; B, threat,  $N = 8$ . Test materials were 8 booklets, each containing 30 successive carbon copies of the test word, the least clear copy first and the clearest last. The S was given two practice booklets. Then, a list of 50 words was read to him, while he also read it. Group A list had the critical words embedded in neutral configurations; Group B had critical words embedded in sexual configuration. Both groups were then tested on the 6 booklets.

**RESULTS:** Three measures were used: the number of pages needed to decipher (a) practice words; (b) four critical words; (c) two neutral words. Group B needed significantly fewer pages ( $M_A = 68.5$ ,  $M_B = 55.0$ ,  $p < .01$ ) for the critical words, but almost identical pages on the practice words ( $M_A = 31.29$ ,  $M_B = 31.25$ ). One could maintain that Group B Ss "set" for sex words, established sex hypotheses, and therefore deciphered the sex words earlier. If this set were operating, a delay should be expected in deciphering the neutral words. This expectation is not confirmed.

**CONCLUSION:** (a) Word meaning is an important determinant in perceptual behavior; (b) structural determinants and word frequency alone cannot account for these results.

**Wiener, Morton** see Durkee, Ann

**Wilkins, Walter L., & Rigby, Marilyn K.** (*St. Louis University*) **A comparison between militarily oriented and clinically oriented approaches to the definition of selection problems.**

A commonly expressed difficulty in psychological research in military installations, or in any industrial situation, is that related to agreement on not only over-all goals of the research, but more especially on the specific attributes that are considered important in the assessment situation. When personality attributes rather than technical proficiency are heavily weighted, there is great possibility of ambiguity in communication between psychologists and military officers. When, in the developmental stages of a program, the psychologist uses judgments or administrative actions of military officers among his criteria, the lack of agreement on the importance of specific personnel attributes may make obtained results difficult of interpretation. As one approach to the problem of securing better congruence in the definition of crucial behavioral characteristics, the present research reports results in only one such situation, the assessment of characteristics of enlisted men being screened in an active program of selection for



commissioned officers. Forty behavioral characteristics presumably significant for success as a company grade officer were divided into two lists and put into language as specific as possible. Both lists were independently ranked by 15 Marine Corps officers experienced in combat and in screening and by 15 psychiatrists and psychologists experienced in screening work. Correlation between Marine Corps and medicopsychological ranks was .86 for one list of behaviors and .94 for a second, suggesting that when crucial behaviors are expressed in terms, not of traits or attributes, but of behaviors, there can be considerable agreement on what is relevant to the particular assessment situation. Areas of agreement and of disagreement are discussed with possible implications for research workers and those who put research results into operation in military personnel situations.

The research was conducted under contract with the Office of Naval Research.

**Willard, Norman, Jr., & Mathers, Boyd L.** (*Human Research Unit No. 1, Fort Knox*) **An attempt to produce abnormal fixations in the rat.** (Sponsor, Boyd L. Mathers)

Maier has reported jumping stand behavior of the rat which does not appear to conform to reinforcement theory prediction. The shift from an established position-reward-response to a symbol-reward-response was made by about 75% of the animals tested. The remainder developed "abnormal fixations" for the position-reward-response. Maier found that a greater percentage of animals became fixated when trained against their preference. Failure to adapt to the new situation in 200 trials was termed "fixation."

The present investigation was designed to repeat the experiment cited above. Thirty-three male white rats were used. In order to avoid some of the unquantifiable aspects of the jumping stand, a simple tunnel Y maze was used. Stimulus symbols, similar to Maier's, were placed at the entrances of the arms of the maze. In other respects, Maier's procedure was followed without change.

Following training to a criterion of 157 correct responses out of 160 trials, the symbol-reward-response procedure replaced the position-reward-response design. After 320 additional trials, 97% of the animals were "fixated." For 100 more trials, delay was introduced for an incorrect response. Thirty-two animals remained "fixated." Next, an extinction procedure was introduced. During 180 postextinction trials, two animals solved the symbol-reward-response problem.

The variability of performance was not significantly different between groups trained with and against

their preference. Each of the several techniques instituted to break down the "fixations" increased the variability of the groups. However, the increase in variability was not sufficient to bring about acquisition of the new response.

The results are discussed with reference to Maier, Wilcoxon, and reinforcement theorists. Special reference is made to partial reinforcement.

**Willemin, Louis P.** *see* Robins, Alexander R.

**Wilson, Clark L.** *see* Mackie, Robert R.

**Wing, Cliff W., Jr.** (*Urban Life Research Institute, Tulane University*) **Some effects of environmental temperature on maze learning in albino rats.**

The purpose of this experiment was to investigate some of the effects of environmental temperature upon maze learning of albino rats. Six groups of 15 rats each were run under three temperature conditions: Condition A, non-air-conditioned mean temperature of 85° F.; Condition B, air-conditioned constant temperature of 75° F.; Condition C, air-conditioned variable temperatures averaging 75° F., ranging between 60° F. and 90° F. Temperature conditions for living quarters and performance quarters were varied in the following fashion:

Group I lived and performed under Condition A. Group II lived under Condition A and performed under Condition B. Group III lived under Condition B and performed under Condition A. Group IV lived and performed under Condition B. Group V lived under Condition C and performed under Condition C<sub>1</sub> (ascending temperature series). Group VI lived under Condition C and performed under Condition C<sub>2</sub> (descending temperature series).

Performance was measured in terms of time and error scores on a Stone 14-choice multiple T maze. Although humidity factors were not well controlled, the results supported these conclusions: (a) Ss living and performing under cooler temperatures (75° F.) took less time and made fewer errors than Ss living and performing under warmer temperatures (85° F.). (b) Under short exposure to the cooler temperatures—during performance only—measures of running speed were affected more than measures of error. (c) Under longer exposure to the cooler temperatures—during the living period—measures of both time and error were affected. (d) Variability of performance increased as temperature increased. (e) Environmental temperature had a greater effect upon the latter phase of performance than upon the initial phase.

**Winne, John F.** *see* Scherer, Isidor W.

**Winthrop, Henry.** (*Richmond Professional Institute of the College of William and Mary*) **The quantification of some aspects of social psychology.** (Sponsor, William E. Cook)

The growing, new field of diffusion theory and research is defined and its objectives stated. An examination is undertaken of the nature of such concepts as "diffusible behavior" and "shared responses," and the meaning of "distorted behavior." The area which is hybrid to the new field of diffusion theory and the existing fields of communication theory, information theory, and group dynamics is described. In particular, the problem of behavioral distortion, which is common to diffusion theory and communication theory, is discussed in relation to the various factors that can produce distortion of behavior and of messages, when they spread or diffuse. The possibilities for operational definitions of various types of distortion are touched upon, particularly in relation to the content of the spreading behavior and the structure of the group in which it is diffusing. In developing mathematical models for predicting the spread of new behavior, a distinction is made between being exposed to such behavior, acting upon such behavior, and transmitting it. An outline is then furnished of the basic factors that seem appropriate for diffusion theory. This outline involves the separate treatment of diffusion which is on a strictly person-to-person basis and diffusion due to a central, one-way source of transmission. Definitions are then given of symmetrical and unsymmetrical diffusion. The three most basic concepts of diffusion theory required for the development of mathematical models are then described, namely, the characteristic "sociality pattern" of a transmitting population, the characteristic types of "repetitious contacts" an individual makes with his acquaintances already affected by new behavior, and the concept of the "acquaintance structure" of a population, which describes the degree of cohesiveness for transmission purposes, of any given population. The uses to which the new field of diffusion theory and research can be put is then briefly commented upon.

**Witty, Paul A.** (*Northwestern University*) **Television preferences of pupils, their teachers, and their parents.**

This paper will include an analysis of the television preferences and attitudes of more than 12,000 elementary and high school pupils as well as their parents and their teachers. Emphasis will be given to the relationship of amount of time spent televising to health, intelligence, educational attainment, personality adjustment, and reading. The data presented will include the results of five surveys made in the Chicago area each year during the interval 1950-1954.

**Wolf, Irving, & Berkeley, Austin W.** (*VA Hospital, Brockton, Massachusetts and Boston University*) **Acquisition and recall in relation to hostile drive strength and stimuli connoting hostility.**

The purpose of this study was to investigate the relationships between acquisition and recall of stimuli connoting hostility in high and low hostile drive strength groups.

Experimental Ss were 31 male college students. They were selected from over 200 students and were divided into a high and low hostile drive strength group of 15 and 16 Ss respectively on the basis of Elizur's content analysis score for hostility on the Rorschach test.

By the serial anticipation method, Ss learned words which had been divided into lists having hostile and nonhostile connotations on the basis of judgments from a group of psychologists. After the acquisition experiment was completed, the same Ss were tested for immediate recall of a memory paragraph having units with hostile connotations and others without these connotations.

The following three predictions were proposed: (a) Acquisition and recall are negatively related to stimuli connoting hostility when hostile drive strength is undifferentiated; (b) acquisition and recall are unrelated to hostile drive strength when stimuli are undifferentiated; (c) acquisition and recall are negatively related to hostile drive strength in interaction with stimuli connoting hostility.

Utilizing the method of analysis of variance, the data supported all three predictions with respect to acquisition. For recall, results supported the first two but not the third prediction. These findings are discussed with respect to the interrelationships among the variables of hostile drive strength, stimuli, and task. The discrepancy with regard to acquisition and recall performances as revealed in the test of the third prediction is discussed in terms of differential effects of personality defenses with respect to the variables of the study.

**Wolman, Benjamin B.** (*College of the City of New York*) **The impact of frustration on group cohesiveness.**

**PROBLEM:** Cohesiveness is defined as the tendency of individuals to stay in their group. The reported experiment tests the hypothesis that cohesiveness depends on power and acceptance, power being defined as the ability to satisfy needs, and acceptance as willingness to do so. A division of groups into three categories is suggested. In an Instrumental group people seek power and acceptance; in a Mutual Acceptance group people are willing to give and to take; in a

Vectorial group people give power and acceptance—it is an idealistic type of group.

**SUBJECTS AND PROCEDURE:** Three groups equalized on age, sex, education, etc. were formed each representing one of the respective three group types. Each group held two sessions. At each session the groups were presented with identical tasks. At the first session 30% of the tasks were unsolvable, and a mild feeling of frustration was produced. At the second session 60% of tasks presented to the groups were unsolvable; thus the degree of frustration was substantially increased.

At the end of each session Statogram was administered. Statogram is a new research tool in the study of small groups that measures how people perceive each other in terms of power and acceptance, and determines cohesiveness and leadership in the group. The results are presented graphically on quasi-Cartesian ordinates and mathematically elaborated.

**RESULTS AND CONCLUSIONS:** In the Instrumental and Vectorial groups cohesiveness was better correlated to power than to acceptance, while the opposite was found in the Mutual Acceptance group. Group cohesiveness suffered most in frustration in the Instrumental group and least in the Vectorial. Apparently, frustration is most dangerous to groups where people strive to get power and acceptance, and least in groups where the tendency to give is prevalent.

**Woo, Kun Kan.** (*Roosevelt College*) **A statement of different theories of learning for the educational psychologist.**

A brief review of the most important learning theories and experiments is presented. An effort has been made in this paper to evaluate and interpret these theories for the educational psychologist.

The beginnings of modern psychology of learning were marked by (a) Ebbinghaus' study of memory and his finding, (b) Bryan and Harter's investigation on telegraphic learning and their theory "A Hierarchy of Habits," and (c) Thorndike's early experiments on animal intelligence.

Five theories of learning are discussed: (a) Functionalism, and the changing concept of the child. The influences of James, Dewey, and Angell. (b) Connectionism: Thorndike's law of effect, theory of identical elements. (c) Early behaviorism: Watson's contributions and limitation. (d) Conditioning: Pavlov's original work; Guthrie's stand; Hull's mathematical deductive behaviorism; Spence's continuity theory; Hilgard's evaluation. (e) Field theory: Köhler's discovery of insight; Koffka's trace theory; Lewin's concept of differentiation of unstructured area; Tolman's sign gestalt theory; Muenzinger's vicarious

trial and error learning; Hartmann's exposition of field theory.

**Woolsey, C. N.** *see* Leibowitz, H.

**Wright, Stuart.** (*University of Chicago*) **Some personality characteristics of academic under-achievers.**

**PROBLEM:** A comparison of matched pairs of under-achievers and controls in an attempt to add to our knowledge about the former.

**PROCEDURE:** 54 college sophomores with significant differences in grade average and in the effect of final examination scores on final course grades were matched on ten variables, such as socioeconomic status and intelligence, that have been shown to be positively correlated with academic performance. One purpose of the study was to find a short screening device for use by counselors in locating underachievers in a given student population.

The battery consisted of the MMPI, Cattell 16 PF, Rosenzweig P-F, essay, Rorschach, GSR conditioning, GSR resistance levels, and a tachistoscopic presentation of loaded and neutral word pairs; Rosenzweig and essay not reported on. Conventional scoring throughout except for Rorschach, for which a new content analysis was used in addition to certain Beck factors. The two groups were compared by means of a modified covariance technique which adjusted for poor matching in three variables.

**RESULTS:** Significant differences were found for two scales of the MMPI, four scales of the 16 PF, GSR conditioning to a colored light, and GSR resistance levels and ranges. No significant differences were found on the Rorschach or the tachistoscope. Evidence indicates that the underachievers are less concerned with social approval, more hysterical, more nonconforming, more tense, more emotionally unstable, more undependable, more lacking in frustration tolerance, more trustful, more warm than the controls. Their range of emotional response was relatively narrow, they showed free-floating anxiety, and their neurological responsivity was poorly discriminating. Initial GSR resistances and resistance levels after five minutes at rest significantly differentiate underachievers from controls and are a reliable predictor of underachievement. (Slides)

**Wrigley, Charles, Twery, Raymond, & Golub, Gene H.** (*University of Illinois*) **The distinction between common factors and significant factors.**

There have been two approaches to the problem of deciding upon the number of factors to be extracted. The first is algebraic. It is proposed that communalities be found that reduce the rank of the correlation



matrix to a minimum. The second is statistical. Only those factors which are statistically significant should be retained. A common factor is not necessarily statistically significant, and a significant factor is not necessarily a common factor.

This paper (a) reconsiders the relations between these two ways of reducing the number of factors, (b) presents a procedure for finding the number of common factors, (c) proposes that factors be retained only if they can be established as both common and statistically significant, (d) reports upon the number of factors established as significant by the Lawley-Rao test for maximum likelihood factor solutions and on the number of common factors found by our own procedure.

It will be proved that, when the squared multiple correlation of each variable with the remaining variables is inserted in the leading diagonal of the correlation matrix, the number of positive latent roots is a lower bound for the number of common factors. In our view this lower bound should be used for deciding upon the number of common factors to be retained until some procedure is developed for determining the minimal rank more exactly.

Numerical examples will then be considered, comparing the number of factors established by this procedure and the number shown to be statistically significant by the use of the method of maximum likelihood. Admittedly the determination of the number of significant common factors along these lines is practicable only on an electronic computer. These empirical comparisons, however, enable us to find the degree of precision of our customary desk-calculator procedures for deciding upon the number of factors.

Wrigley, Charles *see* Gaier, Eugene L.

Wyers, Everett J. *see* Rosenzweig, Mark R.

Yuker, Harold E. (*Hofstra College*) **Cooperation and group recall.**

**PROBLEM:** (a) To compare group recall with individual recall and to examine the effects of the group recall upon a subsequent individual recall. (b) To study the effects of group atmosphere (particularly cooperation and competition) upon recall.

**PROCEDURE:** Bartlett's "War of the Ghosts" was read to 40 four-person groups, and each group member was asked to write down the story as he recalled it. This was followed by a group recall during which the group was given instructions designed to create either a cooperative or a competitive atmosphere. A second individual recall followed the group recall. Finally, each S filled out a questionnaire describing his attitudes during the experiment.

**RESULTS AND CONCLUSIONS:** Comparisons of the three

recalls without regard to the experimental variables of cooperation and competition revealed that: (a) the group recall was superior to both the first and the second individual recall; and (b) the second individual recall was superior to the first individual recall; and (c) there was less variation within the group on the second individual recall than on the first individual recall.

Questionnaire analysis revealed that there were significant differences in the amount of cooperativeness and competitiveness in the two types of groups. Comparison of the group recalls revealed that the group recall in the cooperative situation was superior to the group recall in the competitive situation.

The ten groups averaging the greatest improvement from the first to the second individual recall were compared with the ten groups showing the least improvement with respect to differences in group atmosphere. The groups showing both the most improvement and the best group recall were generally those in which the group members liked working with the group, felt that the group usually made its own decisions, and felt that the group helped their thinking.

Zalkind, S. S., Feinberg, M. R., & Edgerton, H. A. (*Richardson, Bellows, Henry & Co., Inc., Brooklyn College, and College of the City of New York*) **An evaluation of contemporary information concerning the effects of extreme cold upon the performance of military personnel.**

**PROBLEM:** To investigate the effects of extreme cold on the training, selection, morale, and job performance of military personnel.

**SUBJECTS AND PROCEDURE:** Two main sources of information were utilized in the course of this study: (a) Pertinent military and civilian research as well as operational reports were systematically surveyed. (b) A questionnaire was developed and interviews with polar authorities were carried out.

**RESULTS AND CONCLUSIONS:** The findings are organized in terms of four areas of psychological significance: selection, training, job performance, and morale.

1. Concerning selection of personnel for duty under conditions of extreme cold, answers to the following questions will be discussed: (a) Is special personnel selection for polar duty required on the basis of physical characteristics, intelligence, and job skills or abilities? (b) Are there special personality and background factors required for Arctic duty? (c) Are there unique leadership skills required for Arctic duty?

2. In connection with training, the following general problems are discussed: (a) The skills involved in the performances of billets or jobs; (b) the spe-

cial problems of living under extreme cold; (c) attitudes toward Arctic or Antarctic conditions.

3. Job performance is considered in terms of bodily reaction, fatigue, and efficiency.

4. Morale problems which occur are: (a) Are there any morale factors which are apparently unique to Arctic life? (b) What is reported on the relationship between leadership and morale in the Arctic?

The impact of current psychological research methods has not been sufficiently felt in the research studies concerned with man's psychological and physiological reactions to extreme cold. Previous methodological deficiencies as related to the nature of present data will be considered.

Implications of the findings of this study and hypotheses concerning selection, training, and morale will be presented. Of greater import to psychological theory and experimental psychology are the problems involved in the manipulation of such broadly designated variables as isolation, cold per se, and stress; these appear to be involved in what explorers and novelists have commonly called "Arctic effects."

This research was conducted under contract between Richardson, Bellows, Henry & Co., Inc., and the Office of Naval Research. Security clearance for the release of specific findings pertinent to this paper will be obtained before presentation.

Zener, Karl E. *see* Bleke, Priscilla D.

Ziller, Robert C. (*AF Personnel and Training Research Center, Stead AFB*) **Four techniques of decision making under uncertainty.**

**PROBLEM:** Military aircrews frequently find themselves in situations in which they are forced to select a course of action from a limited number of alternatives all of which involve uncertainty and risk. For example, should the crew bail out or attempt to crash land? Abort or continue with the mission? It was the modest objective of this study to explore the group member's reactions to four techniques of decision making in a mock situation of the type described above.

**SUBJECTS:** 45 regular aircrews composed of ten men for the most part.

**PROCEDURE:** Essentially, the experimental procedure was as follows: (a) orientation of the group to the study; (b) completion of the sociometrics, attitude questionnaire, and F scale; (c) private orientation of the leader to the decision-making technique assigned to his group; (d) presentation of the decision-making incident; (e) group decision; and (f) decision-making questionnaire.

The independent variables include the four decision-making techniques, leader acceptance, crew attraction, and F-scale score of the leader. The dependent variables include nine reactions of the crew members to the decision and the decision-making process.

Briefly, the four decision-making techniques were (a) authoritarian (no discussion; the leader's decision was the crew decision); (b) leader-suggestion (the leader stated his opinion prior to the group discussion); (c) group-leader census (the leader stated his opinion during the discussion but after taking a census of the opinions of the group members); (d) leader-chairman (the leader guided a discussion without revealing his own opinion).

**RESULTS:** In studying the relationship between the responses to the questionnaire items, a high negative correlation was found between satisfaction with the decision and perception of the degree to which the group was unified during the discussion ( $r = -.88$ ). There was also evidence that there was less need for participation when the problem was perceived as being relatively easy ( $r = .59$ ). Turning to the techniques, the crew members expressed most satisfaction with the group-leader census technique and least satisfaction with the authoritarian technique. As to the decision, when the decision-making process was group-centered rather than leader-centered, the group reached a decision which involved greater personal risk to the group. Other results are discussed.

Zimiles, H. *see* Green, R. F.

## SYMPOSIA AND OTHER MEETINGS<sup>2</sup>

### AMERICAN PSYCHOLOGICAL ASSOCIATION

#### Presidential Address

LAURANCE F. SHAFFER, chairman

O. HOBART MOWRER. The Psychologist Looks at Language

#### Annual Report to the Membership

O. HOBART MOWRER, President

CARROLL L. SHARTLE. APA Finances and the 1954 Budget

ARTHUR W. MELTON. Major Decisions of the 1954 APA Council Meetings

FILLMORE H. SANFORD. Annual Report of the Executive Secretary

Induction of New President

#### Education and Training Board. Open Meeting

#### Committee on Psychological Service Centers. Open Meeting

#### Film Showings, Committee on Audio-Visual Aids Developmental

Maternal Deprivation in Young Children (New York University Film Library)

A Two-Year-Old Goes to Hospital (New York University Film Library)

From Sociable Six to Noisy Nine (McGraw-Hill Text Films)

KEITH J. HAYES AND CATHY HAYES. Mechanical Interest and Ability in a Home-Raised Chimpanzee (Psychological Cinema Register)

#### Clinical and Counseling

Jealousy (McGraw-Hill Text Films)

Report on Donald (Psychological Cinema Register)

PETER J. NAPOLI. Finger Painting as a Projective Technique (Psychological Cinema Register)

Counselor's Day (McGraw-Hill Text Films)

Using Analytical Tools (McGraw-Hill Text Films)

Diagnosis and Planning Adjustments in Counseling (McGraw-Hill Text Films)

Head of the House (Mental Health Film Board)

#### Mental Health

Out of True (International Film Bureau)

<sup>2</sup> Business meetings, luncheons and dinners, etc. are not included in this listing. For information concerning such meetings, please see the July *American Psychologist*.

Working and Playing to Health (Mental Health Film Board)

Man to Man (Mental Health Film Board)

Don't Be Afraid (Encyclopedia Britannica Films)

Mental Health (Encyclopedia Britannica Films)

#### Miscellaneous Psychological Films

JOHN S. STAMM. The Function of the Median Cerebral Cortex in Maternal Behavior of Rats

Emotional Maturity (McGraw-Hill Text Films)

Facing Reality (McGraw-Hill Text Films)

Neighbors (International Film Bureau)

Martin and Gaston (George Brest & Associates)

Family Circus (United Productions of America)

Bringing Up Mother (United Productions of America)

The Fifty-First Dragon (United Productions of America)

#### Transcriptions

LIBBY BLEK. Mental Patients Tell Their Story

OTTO KLINEBERG. Culture and Personality

GORDON ALLPORT. Motivation Theory and Psychodynamics

GARDNER MURPHY. Introduction to Parapsychology

MOLLY HARROWER. The Evolution of a Clinical Psychologist

O. H. MOWRER. A Re-Evaluation of Psychoanalysis

Z. A. PIOTROWSKI. Human Movement in the Rorschach Test

**New Fountains.** (An American Theater Wing Community play, produced for the National Foundation for Infantile Paralysis and written by Lee Gilmore)

NATALIE B. KAUFMAN, chairman

PHYLLIS BARTELME, discussant

### 1. DIVISION OF GENERAL PSYCHOLOGY

#### Presidential Address

CARL I. HOVLAND. What's a General Psychologist?

#### Invited Address

CARL I. HOVLAND, chairman

JAMES DREVER, University of Edinburgh. Early Learning and the Perception of Space



**Symposium: Vision and Human Behavior**

MARY K. BAUMAN, chairman

**Participants:**

- HARRY HELSON. Perception and adjustment  
 PHILIP WORCHEL. Visualization and human orientation  
 KATHRYN E. MAXFIELD AND NATHANIEL J. RASKIN. Vision and learning: the development of social maturity in visually handicapped children

**Symposium: Conceptual Trends in Psychology**

WILLIAM C. H. PRENTICE, chairman

**Participants:**

- RICHARD CHRISTIE. Social psychology  
 ROBERT A. PATTON. Physiological psychology  
 NORMAN MUNN. Comparative psychology  
 WILLIAM C. H. PRENTICE. Perception

(Slides)

**Symposium: Heredity and Behavior**

JOHN L. FULLER, chairman

**Participants:**

- W. R. THOMPSON. Genetic factors in behavior—the animal evidence  
 HERLUF H. STRANDSKOV. Some aspects of the genetics of human behavior  
 R. B. CATTELL AND G. F. STICE. Hereditary influences upon personality source traits  
 JOHN L. FULLER. How genes may affect behavior

(Slides)

**Symposium: The Place of the Concept of Drive in Motivation Theory**

L. STARLING REID, chairman

**Participants:**

- CHARLES N. COFER. An evaluation of the concept of drive  
 PAUL T. YOUNG. The concept of drive in the light of experimental research

Discussants: ELIOT STELLAR, JULIAN ROTTER

**Symposium: Muscle Tension and Behavior**

R. C. DAVIS, chairman

**Participants:**

- ROBERT B. MALMO. Can muscle tension be used as an "affective index"?  
 DONALD R. MEYER. Response distribution, anxiety, and drive  
 R. C. DAVIS. Muscle action potentials and the response systems of the organism

**Symposium: Effects of Drugs on Behavior**

JOSEPH ZUBIN, chairman

**Participants:**

- G. R. WENDT. The effects of drugs on social and emotional behavior

DANIEL WILNER. Some social factors in drug use  
 MURRAY JARVIK. Some psychophysiological effects of drugs

CONAN KORNETSKY. The effects of drugs on personality

**2. DIVISION ON THE TEACHING OF PSYCHOLOGY****Presidential Address**

JOHN F. DASHIELL. Undergraduate Psychology: A Science or a Profession?

**Invited Address**

RENSIS LIKERT, chairman

MICHAEL AMRINE, Public Information Consultant, American Psychological Association. Communicating Research Results to Administrators and the Public

Discussants: ALFRED J. MARROW, AMRAM SCHEINFELD

**Symposium: Some Contributions of Psychology to the Understanding and Appreciation of Other Academic Fields**

ROBERT S. HARPER, chairman

**Participants:**

- IRWIN A. BERG. Some relations of psychology to the social sciences  
 CLARENCE LEUBA. Some relations of psychology to the life sciences  
 EDWIN B. NEWMAN. Some relations of psychology to the physical sciences  
 LAWRENCE E. COLE. Some relations of psychology to the humanities

**Symposium: Education of the Gifted**

(Co-sponsored with Division 15. See Division 15's program)

**Symposium: Psychology in the Redevelopment of Curricula in Medical Schools**

(Co-sponsored with Division 12. See Division 12's program)

**Symposium: New Courses in Introductory Psychology**

FRANK W. FINGER, chairman

**Participants:**

- K. C. MONTGOMERY. A concept-centered first course in psychology  
 CARL PFAFFMANN AND HAROLD SCHLOSBERG. "The Identification and Criticism of Ideas" as a new approach to the first course

Discussant: THEODORE LANDSMAN

**Symposium: Teaching Psychology in High Schools**

T. L. ENGLE, chairman

**Participants:**

T. L. ENGLE. Methods used in teaching psychology in secondary schools

ARTHUR T. JERSILD. The Columbia University workshop on high school psychology

RALPH J. OJEMANN. The place of psychology in content courses

PAUL V. STODDARD. High school psychology courses from the viewpoint of the high school administrator and teacher

**Symposium: Training for Business and Industry**  
(Co-sponsored with Division 14. See Division 14's program)**Group Discussion: Internships for Training Teachers of Psychology**

JOHN F. HALL, chairman; JOHN E. MILHOLLAND

**Group Discussion: The Future of Division 2**

ELIZABETH B. HURLOCK, chairman; J. F. DASHIELL, R. W. HUSBAND, NORMAN MUNN, LILLIAN PORTENIER, CLAUDE E. BUXTON, RICHARD P. YOUTZ

**Discussion: Standardization of Beginning Experimental Psychology**

LAWRENCE M. BAKER, chairman; T. G. ANDREWS, B. R. BUGELSKI, MILES A. TINKER, AND HOMER E. WEAVER

**Group Discussion Based on the Book *Improving Undergraduate Instruction in Psychology* by Wolfe, Buxton, Cofer, Gustad, MacLeod, and McKeachie**

WILBERT J. MCKEACHIE, chairman; F. K. BERRIEN AND JOHN A. HORROCKS

**3. DIVISION OF EXPERIMENTAL PSYCHOLOGY****Presidential Address**

D. O. HEBB. Drives and the C.N.S. (Conceptual Nervous System)

**Symposium: Unlearned Behavior: Concept and Findings**

(Co-sponsored with Division 7. See Division 7's program)

**Symposium: Distribution of Practice in the Learning of Motor Skills**

R. B. AMMONS, chairman

Participants: R. B. AMMONS, T. W. COOK, D. S. ELIS, G. A. KIMBLE

**5. DIVISION ON EVALUATION AND MEASUREMENT****Presidential Address**

EDWARD E. CURETON. Personality: Trait Names and Test Items

**Symposium: Quantitative Training Desirable for the PhD Degree in Psychology**

(Co-sponsored with Psychometric Society)

HAROLD GULLIKSEN, chairman

HAROLD P. BECHTOLDT. Quantitative training desirable for the PhD degree in psychology

CLYDE H. COOMBS. Quantitative training desirable for the PhD degree in psychology

EDWARD E. CURETON. Quantitative training desirable for the PhD degree in psychology

ALLEN L. EDWARDS. Quantitative training desirable for the PhD degree in psychology

QUINN MCNEMAR. Quantitative training desirable for the PhD degree in psychology

WILLIAM G. MADOW. Quantitative training desirable for the PhD degree in psychology

**Symposium: The Improvement of Locally Made Tests**

(Co-sponsored with Division 15)

HOWARD B. LYMAN, chairman

JEROME E. DOPPELT. Improvement of locally made tests

PAUL L. DRESSSEL. Improvement of locally made tests.

PETER F. MERENDA. Improvement of locally made tests

JULIAN P. STANLEY. Improvement of locally made tests

**Symposium: Use of High-Speed Digital Computers**

(Co-sponsored with Psychometric Society. See Psychometric Society's program)

**Symposium: Pattern Analysis**

(Co-sponsored with Division 15 and Psychometric Society)

SAUL B. SELLS, chairman

MASIL B. DANFORD. Pattern analysis

ERNEST A. HAGGARD. Pattern analysis

DAVID V. TIEDEMAN. Pattern analysis

LOUIS L. MCQUITTY. A pattern analytic method for isolating both typological differentiae and typodimensions

**Symposium: Recent Developments in the Evaluation of Training**

(Co-sponsored with Psychometric Society)

WILLIAM G. MOLLENKOPF, chairman

JOHN T. DAILEY. Recent developments in the evaluation of training

NORMAN FREDERIKSEN. Recent developments in the evaluation of training

ARTHUR A. LUMSDAINE. Recent developments in the evaluation of training

J. WAYNE WRIGHTSTONE. Recent developments in the evaluation of training

#### **Symposium: Measuring Complex Abilities by Trouble-Shooting Techniques**

(Co-sponsored with Division 14 and Psychometric Society)

S. S. DUBIN AND V. M. TYE, co-chairmen

DORA E. DAMRIN. TAB ITEM: A technique for the measurement of proficiency in diagnostic problem-solving tasks

NICHOLAS A. FATTU. Psychological theory basic to measurement of trouble-shooting skills

EUGENE L. GAIER. Technique of problem solving as a predictor of mechanical success

WILLIAM W. GRINGS. Electronics trouble shooting

### **7. DIVISION ON CHILDHOOD AND ADOLESCENCE**

#### **Presidential Address**

NANCY BAYLEY. Individual Patterns in Development

#### **Symposium: Origins of the Social Motive in the Child**

(Co-sponsored with Division 8)

IRVIN L. CHILD, chairman

##### **Participants:**

B. F. SKINNER. Can motives be learned?

HENRY W. NISSEN. The phylogeny of social motivation

ALFRED L. BALDWIN. Origins of aggression

#### **Symposium: Developmental Principles in Childhood and Senescence**

(Co-sponsored with Division 20. See Division 20's program)

#### **Symposium: Unlearned Behavior: Concept and Findings**

(Co-sponsored with Division 3)

LEONARD CARMICHAEL, chairman

##### **Participants:**

D. O. HEBB. If man is a mammal, why doan he act like a mammal? You tell me dat.

WILLIAM S. VERPLANCK. The governing environment

GERTRUDE HILDRETH. The development and learning of manual dominance

ECKHARD HESS. The critical age for imprinting in water fowl

#### **Discussion Group: Informal Reports of Research in Various Institutions**

GEORGE G. THOMPSON, chairman

### **8. DIVISION OF PERSONALITY AND SOCIAL PSYCHOLOGY**

#### **Presidential Address**

RICHARD S. CRUTCHFIELD. Conformity and Character

#### **Symposium: Recent Developments in Research on Language Behavior**

##### **Participants:**

ROGER W. BROWN. A study in language and cognition

JAMES J. JENKINS. Word association revisited

ALVIN M. LIBERMAN. Studies of the perception of synthetic speech

GEORGE A. MILLER. Studies of the perception of human speech

CHARLES E. OSGOOD. Quantitative studies of meaning

#### **Symposium: Theories of Leadership**

BERNARD M. BASS, chairman

Participants: JOHN R. P. FRENCH, JOHN HEMPHILL, CECIL GIBB

Discussants: DORWIN CARTWRIGHT, LAUNOR CARTER, MARTIN LIPSET

#### **Small Discussion Group: Homosexuality: Theories and Concepts**

S. J. FIELDS, chairman

#### **Symposium: Theory and Research in Interpersonal Perception**

URIE BRONFENBRENNER, chairman

Participants: NATHANIEL GAGE, JOHN HARDING, FRITZ HEIDER, RENATO TAGIURI

#### **Symposium: Origins of the Social Motive in the Child**

(Co-sponsored with Division 7. See Division 7's program)

#### **Small Discussion Group: Integrative Approaches to Group Therapy with Special Reference to Interpersonal Relationships**

ELMORE MARTIN, chairman

### **9. SOCIETY FOR THE PSYCHOLOGICAL STUDY OF SOCIAL ISSUES**

#### **Presidential Address**

EUGENE L. HARTLEY. Giant Step, Baby Step

#### **Kurt Lewin Memorial Award Address**

MARGARET MEAD. Cultural Discontinuities and Personality Transformation



**Symposium: The Teacher Shortage as a Social Issue**

W. W. CHARTERS, JR., chairman

**Participants:**

- ELI GINZBERG, National Manpower Council  
 DAEL WOLFLE, American Association for the Advancement of Science  
 COLEMAN R. GRIFFITH, University of Illinois

**Symposium: Change in Control Processes in Social Organization: A Field Experiment**

DANIEL KATZ, chairman

**Participants:**

- NANCY MORSE. Basic dimensions of an experiment in social control: theory, measurement, results  
 EVERETT REIMER. Creating experimental social change in an ongoing organization  
 ARNOLD TANNENBAUM. The relationship between personality variables and adjustment to contrasting types of social structure  
 CAROL KAYE. The effects on organizational goal achievement of a change in the structure of roles

**Symposium: Problems of Desegregation**

ISIDOR CHEIN, chairman

**Participants:**

- KENNETH B. CLARK, City College of New York  
 JOHN DEAN, Cornell University  
 THURGOOD MARSHALL, National Association for the Advancement of Colored People

**Symposium: Human Behavior in Natural Disasters**

CARLYLE JACOBSEN, chairman

**Participants:**

- ELI S. MARKS AND CHARLES FRITZ. Human behavior in disaster; the NORC research findings  
 JOHN W. POWELL. Personality variables in response to disaster; the study of firemen in Worcester  
 BRADFORD B. HUDSON, JOHN McDAVID AND MANAN ROCO. Response to the perception of threat  
 HARRY B. WILLIAMS. Research on the human aspects of disaster

**Symposium: Psychological Approaches to the Problem of Anti-Intellectualism**

S. STANSFELD SARGENT, chairman

Participants: ROLLO MAY, G. M. GILBERT, C. HERBERT STEMMER

**Symposium: Anti-Intellectualism as Seen by Social Scientists**

THEODORE BRAMELD, chairman

Participants: CAREY McWILLIAMS, BERNARD BARBER, WILLIAM E. LEUCHTENBERG

**Discussion Group: What is the Psychology of the Relative Lack of Application of Psychology to Social Issues?**

GEORGE W. HARTMANN, chairman

**Discussion Group: The Psychoanalytic Approach to Group Dynamics**

MAX ROSENBAUM, chairman

**Discussion Group: The F Scale in Relation to Subcultures**

GERARD G. NEUMAN, chairman

**Committee on Methods of Group Consultation****10. DIVISION OF ESTHETICS****Presidential Address**

R. M. OGDEN. Recollections of Aesthetics

**12. DIVISION OF CLINICAL AND ABNORMAL PSYCHOLOGY****Presidential Address**

WILLIAM A. HUNT. A Rationale for Psychiatric Selection

**Symposium: Recent Developments in Projective Techniques for the Study of Delimited Aspects of Personality**

(Co-sponsored with the Society for Projective Techniques. See the Society's program)

**Symposium: Clinical Aspects of Counseling with the Disabled**

(Co-sponsored with the National Council on Psychological Aspects of Disability)

JAMES F. GARRETT, chairman

**Participants:**

- SALVATORE G. DiMICHAEL. Utilization of tests  
 SAMUEL B. KUTASH. Therapeutic processes.  
 DARRELL MASE. Relationship of psychological data  
 LEE SEWALL, Manager, VA Hospital, Downey, Ill. Essentiality of the team approach

**Symposium: Problems of Projective Methods in Studying Coping Patterns of Young Children**

(Co-sponsored with the Society for Projective Techniques. See the Society's program)

**Symposium: Basic Postulates in Psychotherapy**

GORDON F. DERNER, chairman

**Participants:**

THOMAS MALONE, assistant professor of psychiatry, Emory Medical School. Eclectic viewpoint

JULE NYDES, National Psychological Association for Psychoanalysis. Freudian and cultural psychoanalytic viewpoint

CARL R. ROGERS, professor of psychology, University of Chicago. Client-centered viewpoint

DANIEL N. WIENER, Chief Clinical Psychologist, VA Regional Office Mental Hygiene Clinic, St. Paul, Minn. Integrative psychotherapy viewpoint

GORDON F. DERNER, Director of Clinical Psychology Training Program, Adelphi College. Neo-psychoanalytic viewpoint

JOHN N. ROSEN, MD, private practice. Direct psychoanalytic viewpoint

**Symposium: Some Current Problems in Diagnostic Testing**

SOL L. GARFIELD, chairman

**Participants:**

HAROLD SAMPSON. Problems reflected in research on clinical test validation

RALPH W. HEINE. Conflicts in the goals of clinical testing

CARLOS A. CUADRA. Problems in the communication of test findings

WILLIAM P. ALBAUGH. Problems in diagnostic training

**Symposium: Patterns of Personality Adjustment of the Aged in Institutional and Retirement Community Settings**

(Co-sponsored with Division 20. See Division 20's program)

**Symposium: The Significance of the Interpersonal Relationship in the Projective Test Situation**

(Co-sponsored with the Society for Projective Techniques. See the Society's program)

**Symposium: Problems of Interdisciplinary Relations: Areas of Agreement and Disagreement—Essential Conditions for Improving Relations**

(Co-sponsored with Division 17, with the joint collaboration of the APA Committee on Relations with the Social Work Profession and the Committee on Relations with Psychology of the American Association of Psychiatric Social Workers. See Division 17's program)

**Symposium: Private Practice and Public Responsibility**

EMANUEL K. SCHWARTZ, chairman

Participants: ALBERT ELLIS, W. R. KING, BOHDAN ZAWADSKI

**Symposium: Psychology in the Redevelopment of Curricula in Medical Schools**

(Co-sponsored with Division 2)

IVAN N. MENSCH, chairman

**Participants:**

MILTON J. HOROWITZ. Rebuilding from the ground up for more effective teaching

JOHN J. CONGER, University of Colorado School of Medicine. The teaching of general medical service in family medical care

JOSEPH D. MATARAZZO, Washington University School of Medicine. Comprehensive medicine theory and practice

**Symposium: The Sociology of Psychotherapy**

NEVITT SANFORD, chairman

**Participants:**

JOSEPH B. ADELSON, professor of social science, Bennington College

KENNETH BURKE, social philosopher

**Symposium: Cultural Approaches to Psychotherapy**

GEORGENE H. SEWARD, chairman

Participants: MARGARET MEAD, FRANK AULD, JR., KENNETH B. CLARK, PAULINE SEARS

**Symposium: The Nature of Clinical Psychological Skill**

ERASMUS L. HOCH, chairman

**Participants:**

FRED BROWN, Chief Psychologist, Mt. Sinai Hospital, New York City

LOUIS DELMAN, Chief Clinical Psychologist, VA Hospital, Lyons, N. J.

EDITH LORD, Chief, Clinical Psychology Training Unit, VA Hospital, Montrose, N. Y.

EDWARD JOSEPH SHOEN, Jr., Teachers College, Columbia University

**Symposium: The Mental Hospital as a Small Society: Multidisciplinary Approaches**

DANIEL J. LEVINSON, chairman

**Participants:**

MORRIS S. SCHWARTZ. A sociologist whose research on ward interaction helped to establish a multidisciplinary approach in this field

**JULES HENRY.** An anthropologist who has been studying the formal organization of a mental hospital

**MILTON GREENBLATT.** A psychiatrist who has done research on the mental hospital as a therapeutic community

**DANIEL J. LEVINSON.** A psychologist who is doing research on the individual ideology, personality, and role functioning in hospital personnel

#### **Symposium: The Changing Functions of the Clinical Psychologist in a Hospital Setting**

SEYMOUR G. KLEBANOFF, chairman

##### **Participants:**

JAMES F. LAWRENCE, VA Hospital, Brockton, Mass.

JOHN R. SCHLOSSER, VA Hospital, Perry Point, Md.

H. MAX HOUTCHENS, VA Central Office, Washington, D. C.

MURRAY J. STERN, Franklin D. Roosevelt VA Hospital, Montrose, N. Y.

##### **Topical Discussion Groups**

The Future of Clinical Psychology. PAUL E. EISERER, chairman

Training in Clinical Psychology. VICTOR C. RAIMY, chairman

The Szondi Test. ARTHUR LEFFORD, chairman

#### **Forum. Guided Open Discussion Based on Submitted Tentative Hypotheses, Propositions, Research Notions, and the Like**

ANNE ROE, chairman

#### **The Rehabilitation Team in Action in a Community Rehabilitation Center: Evaluation Case Conference and Demonstration**

(Co-sponsored with Division 17, the Institute for the Crippled and Disabled, and the Institute of Physical Medicine and Rehabilitation)

HAROLD CHENVEN, chairman of morning session

Orientation by Director

Case Conference: Unrehearsed discussion and disposition of adult client. Participants in case discussion will be from medicine, occupational therapy, physical therapy, psychiatry, social work, psychology, speech and vocational

Invited Discussants: "How the Client Perceives Rehabilitation and the Rehabilitation Center." TAMARA DEMBO, PHYLLIS BARTELME

Group Discussion: Questions and interchange between attending group and panel participants

LEONARD DILLER, chairman of afternoon session

Orientation by Director

Case Conference: Unrehearsed discussion and disposition of adult client. Participants in case discussion will be from medicine, occupational therapy, physical therapy, psychiatry, social work, speech and vocational

Invited Discussants: "Critique of Team Process."

JAMES F. GARRETT, FREDERICK WHITEHOUSE

Group Discussion: Questions and interchange between attending group and panel participants

### **13. DIVISION OF CONSULTING PSYCHOLOGY**

#### **Presidential Address**

E. LOWELL KELLY. Professional Responsibility and Controls in Consulting Psychology

#### **Symposium: Patterns and Values of Group Practice of Consulting Psychologists**

HAROLD M. HILDRETH, chairman

Participants: RAYMOND A. KATZELL, HYMAN MELTZER, DOROTHEA M. SMITH

### **14. DIVISION OF INDUSTRIAL AND BUSINESS PSYCHOLOGY**

#### **Presidential Address**

HAROLD E. EDGERTON. Some Needs in Training Research

#### **Invited Program**

Representatives, The Foundation for Research on Human Behavior. More Effective Research through Better Communication between Industry and Social Scientists

#### **Symposium: Job Analysis: Part 1. Methods and Research**

ERNEST J. McCORMICK, chairman

Participants: SIDNEY A. FINE, JOHN C. FLANAGAN, ROBERT M. GUION, J. C. RUPE

#### **Symposium: Job Analysis: Part 2. Uses and Applications**

ERNEST J. McCORMICK, chairman

Participants: ROGER M. BELLOWES, GRANT BROWN, ERNEST S. PRIMOFF, CHARLES H. TUPPER

#### **Symposium: Training Employment Interviewers**

BERNARD J. COVNER, chairman

Participants: L. L. ARMANTROUT, BENJAMIN B. BALINSKY, MARTIN M. BRUCE, EDWARD E. EDELMAN

#### **Symposium: Communication Aspects of Personnel Evaluation Within Industry**

DORA F. CAPWELL, chairman

Participants: RALPH H. MARKUS, HOWARD G. MILLER, J. RICHARD PORTER



**Symposium: Industrial Psychology in Other Countries**

EDWIN R. HENRY, chairman

Participants: ROY BUTLER, DAVID W. COOK, ADOLPH STUHR

**Symposium: Internships and Field Work Experiences in Developing Industrial Psychologists**

ORLO L. CRISSEY, chairman

Participants: GEORGE K. BENNETT, JAY L. OTIS, ROBERT B. SELOVER, RICHARD S. UHRBROCK, RONALD F. WILSON

**Symposium: Research on Training Needs, Methods, and Results in Business and Industry**

WALTER R. MAHLER, chairman

Participants: BRENT BAXTER, W. J. E. CRISSY, PATRICK C. FARBER, WILLIAM MCGEEHEE, JAROLD R. NIVEN

**Symposium: Development of Useful Criteria in Industrial Research**

CHARLES H. LAWSHE, chairman

Participants: EDWIN E. GHISELLI, NATHAN JASPEN, ERWIN K. TAYLOR, ROBERT L. THORNDIKE, ROBERT J. WHERRY

**Symposium: The Role of Human Engineering in Industry**

LEONARD C. MEAD, chairman

Participants: JEROME H. ELY, ALEX. E. JAVITZ, MERRITT W. OLSON, JOHN W. SENDERS, LEON L. THOMAS

Discussants: WILLIAM C. BIEL, ROBERT B. SLEIGHT

**Symposium: Training for Business and Industry**

N. L. HOOPINGARNER, chairman

(Co-sponsored with Division 2)

**Symposium: Measuring Complex Abilities by Trouble-Shooting Techniques**

(Co-sponsored with Division 5 and Psychometric Society. See Division 5's program)

**15. DIVISION OF EDUCATIONAL PSYCHOLOGY**

**Presidential Address**

IRVING LORGE. The Groupness of the Group

**Symposium: Education of the Gifted**

(Co-sponsored with Division 2)

SIDNEY L. PRESSEY, chairman

Participants:

PHILLIP H. COOMBS. The experiments of the Fund for the Advancement of Education

NANCY BAYLEY. Present status of the Terman gifted child study

HAROLD EDGERTON. The Science Talent Search  
MORRIS MEISTER. The high school of science program

EDWARD S. JONES. The Buffalo anticipatory examination program

**Symposium: Interdepartmental Cooperation in the Preparation of Educational Psychologists**

ARTHUR P. COLADARCI, chairman

Participants: DOROTHY C. ADKINS, ROBERT SEARS, JOHN M. STEPHENS, WM. C. TROW

**Symposium: The Improvement of Locally Made Tests**

(Co-sponsored with Division 5. See Division 5's program)

**Symposium: Pattern Analysis**

(Co-sponsored with Division 5 and Psychometric Society. See Division 5's program)

**Prebusiness Meeting Discussion, I. How May Educational Psychology Be Coordinated with Other Fields of Psychology in Order to Improve the Education of Teachers and Increase Understanding of Research in Educational Areas?**

WILLARD C. OLSON, chairman

Participants: WALTER N. DUROST, MERLE H. ELLIOTT, T. ERNEST NEWLAND

**General Discussion**

**Prebusiness Meeting Discussion, II. What Should Be the Scope and Sequence of the Teaching of Educational Psychology in Undergraduate and Graduate Courses?**

H. H. REMMERS, chairman

Participants: HORACE B. ENGLISH, J. W. TILTON, G. T. BUSWELL

**16. DIVISION OF SCHOOL PSYCHOLOGISTS**

**Presidential Address**

MILTON A. SAFFIR. Looking Ahead with the Division of School Psychologists

**Symposium: School Psychologists—Findings of the APA Work Conference**

BRUCE V. MOORE, chairman

Participants: FRANCES A. MULLEN, T. ERNEST NEWLAND, EDWARD S. BORDIN, DALE B. HARRIS, BEATRICE LANTZ

**Symposium: Psychological Services in Elementary and Secondary Schools**

(Co-sponsored with Division 17. See Division 17's program)

**Symposium: Mental Health in Schools—Research and Experimental Programs**

MORRIS KRUGMAN, chairman

**Participants:**

ALBERT J. HARRIS. Clinical studies of typical children—report from four municipal college clinics

KENNETH W. LUND. Helping teachers with mental health problems

ALMA A. PAULSEN. Experimental programs to improve the mental health of children

DAVID G. SALTEN. A survey of mental health in schools

**Symposium: New Developments in Work with Parents**

HARRY B. GILBERT, chairman

**Participants:**

KATHERINE D'EVELYN. Parent interviews

ETHEL KAWIN. The University of Chicago parent education project

**17. DIVISION OF COUNSELING PSYCHOLOGY****Presidential Address**

MILTON E. HAHN. Counseling Psychology

**Symposium: Group Therapy in Educational Institutions**

WALTER M. LIFTON, chairman

**Participants:**

PHILIP ZLATCHIN. Research in group therapy

SAUL SCHEIDLINGER. The relationship of group therapy to psychological systems

JOHN WARKENTIN. The use of group therapy in training and as a part of classroom instruction

**Symposium: The Role of Counseling in the College Personnel Program**

WALTER F. JOHNSON, chairman

**Participants:**

WILLIAM GILBERT. New frontiers in counseling

HAROLD PEPINSKY. Theoretical implications of counseling

MELVENE HARDEE. Counseling and general education

EDWARD GLANZ. Guidance in relation to the curriculum

**Symposium: Psychological Services in Elementary and Secondary Schools**

(Co-sponsored with Division 16)

ROY B. EMBREE, JR., chairman

**Participants:**

DAVID H. DINGILIAN. The development of psychological services in elementary and secondary schools

ELOISE CASON AND ROBERT HOPPOCK. The total guidance program in elementary and secondary schools

EDWARD LANDY AND EDWARD A. RICCIUTI. The roles of school psychologists, counseling psychologists, and school counselors in the total guidance program

ARTHUR W. COMBS. The relation of APA and its divisions to guidance services in the schools

**Symposium: The Role of Counseling Psychology in Rehabilitation**

(Co-sponsored with the National Council on Psychological Aspects of Disability)

FRANK M. FLETCHER, JR., chairman

Participants: JOHN W. GUSTAD, MILTON E. HAHN, VICTOR C. RAIMY, ROBERT S. WALDROP

**Symposium: Interprofessional Relations—Essential Conditions for Their Improvement**

(Co-sponsored with Division 12, with the joint collaboration of the APA Committee on Relations with the Social Work Profession and the Committee on Relations with Psychology of the American Association of Psychiatric Social Workers)

ROBERT H. MATHEWSON, chairman

**Participants:**

HOWARD MITCHELL. From the viewpoint of the clinical psychologist

TESSE BERKMAN. From the viewpoint of the social worker

JOHN A. MILLETT. From the viewpoint of the psychiatrist

**18. DIVISION OF PSYCHOLOGISTS IN PUBLIC SERVICE****Presidential Address**

J. Q. HOLSOPPLE. Fallacies in Administrative Criteria and Techniques for Establishing the Value Level of Professional Jobs

**Symposium: The Unwilling Client—Problem of Working in Disciplinary Settings**

ARNOLD V. GOULDING, chairman

Participants: WILLIAM R. PERL, J. DOUGLAS GRANT, GEORGE G. KILLINGER, SHELDON B. PEIZER

**19. DIVISION OF MILITARY PSYCHOLOGY****Symposium: The Problem of Sustained Vigilance**

PAUL BAKAN, chairman

Participants: HERBERT JENKINS, JAMES DEESE, SUSAN BARTLETT

Discussant: W. E. KAPPAUF

**Symposium: The Experimental Evaluation of the Application of Television in Military Training**

GEORGE WISCHNER, chairman

Participants: OTELLO DESIDERATO, JOSEPH KANNER, SOL ROSHAL, RICHARD RUNYON, LORAN TWYFORD

**Symposium: A Study of the Characteristics of Successful and Unsuccessful Men Working in Situations of Extreme Stress**

HARRISON GOUGH, chairman

Participants: VICTOR CLINE, TOR MEELAND, NEAL MILLER

**20. DIVISION ON MATURITY AND OLD AGE**

**Presidential Address**

IRVING LORGE. The Search for Maturity

**Symposium: Problems of Measurement and the Development of Tests and Norms for an Adult Population**

JAMES E. BIRREN, chairman

Participants:

HERBERT S. CONRAD. A logical analysis of some of the issues

ROSS A. MCFARLAND. Problems of measurement with aging adults with examples from data on CAA pilot examinations and other sources

ALEXANDER G. WESMAN. How does one standardize a test for use with adults?

ALAN GREY. What are some features of existing tests which impair their usefulness with middle aged and elderly adults?

**Symposium: Patterns of Personality Adjustment of the Aged in Institutional and Retirement Community Settings**

(Co-sponsored with Division 12)

SAMUEL GRANICK, chairman

Participants:

SAMUEL GRANICK. Later maturity in retirement communities

ABEL G. OSSORIO. Planning the social environment of the aged in mental institutions

ALVIN I. GOLDFARB. Psychiatric observations of adjustment in the home for the aged

BERNARD BERKOWITZ. The problems of old age in veteran facilities

**Symposium: Developmental Principles in Childhood and Maturity**

(Co-sponsored with Division 7)

DOROTHEA MCCARTHY, chairman

Participants: JOHN E. ANDERSON, IRVING LORGE, KATHARINE COBB, FRANK K. SHUTTLEWORTH

**CONFERENCE OF STATE PSYCHOLOGICAL ASSOCIATIONS**

**Invited Address**

CHARLES N. COFER, chairman

DAVID W. LOUISELL, professor of law, the Law School, University of Minnesota. The Psychologist in the Legal World: Further Remarks

**Legislative Workshop**

ARTHUR W. COMBS, chairman

General Session. Legislation for Psychology—The National Picture

Problems of National Policy. THEODORE LANDSMAN

APA Central Office Resources for Help on State Legislative Problems. RICHARD R. WILLEY

Discussion Group Sessions. Group Discussion Leaders: M. C. LANGHORNE, ROY M. DORCUS, ROBERT G. BERNREUTER, THEODORE LANDSMAN, ARTHUR W. COMBS, ROLLO MAY, S. RAINS WALLACE, JR., RICHARD R. WILLEY

State Board of Examiners Meetings

General Session. Open Forum

General Session. Legislative Workshop Summary

**AMERICAN BOARD OF EXAMINERS IN PROFESSIONAL PSYCHOLOGY**

Open Meeting on Examinations and Procedures

**PSYCHOMETRIC SOCIETY**

(Program submitted to Division 5)

**Presidential Address**

LEE J. CRONBACH. Report on a Psychometric Mission to Clinicians

**Symposium: Quantitative Training Desirable for the PhD Degree in Psychology**

(Co-sponsored with Division 5. See Division 5's program)

**Symposium: Use of High-Speed Digital Computers**

(Co-sponsored with Division 5)

MAX A. WOODBURY, chairman

JULIAN H. BIGELOW. The Use of High-Speed Digital Computers

FREDERIC M. LORD. The Use of High-Speed Digital Computers

CHARLES F. WRIGLEY. The Use of High-Speed Digital Computers

**Symposium: Pattern Analysis**

(Co-sponsored with Divisions 5 and 15. See Division 5's program)



**Symposium: Recent Developments in the Evaluation of Training**

(Co-sponsored with Division 5. See Division 5's program)

**Symposium: Measuring Complex Abilities by Trouble-Shooting Techniques**

(Co-sponsored with Divisions 5 and 14. See Division 5's program)

**SOCIETY FOR PROJECTIVE TECHNIQUES**

(Program submitted to Division 12)

**Presidential Address**

SAMUEL B. KUTASH. The Impact of Projective Techniques on Basic Psychological Science

**Symposium: Recent Developments in Projective Techniques for the Study of Delimited Aspects of Personality**

(Co-sponsored with Division 12)

L. JOSEPH STONE, chairman

**Participants:**

BARBARA BIBER. Teacher selection test

JACOB LEVINE. Humor test

HELEN D. SARGENT. Insight test

ABRAHAM M. ZEICHNER. Aggression test

Discussants: MARGUERITE R. HERTZ and PERCIVAL M. SYMONDS

**Symposium: Problems of Projective Methods in Studying Coping Patterns of Young Children**

(Co-sponsored with Division 12)

SIBYLLE K. ESCALONA, chairman

Participants: LOIS B. MURPHY, WALTER KASS, GRACE M. HEIDER

Discussant: WILLIAM GOLDFARB

**Symposium: The Significance of the Interpersonal Relationship in the Projective Test Situation**

(Co-sponsored with Division 12)

JULES D. HOLZBERG, chairman

**Participants:**

MAGDA B. ARNOLD. Jungian theory

MORTON DEUTSCH. Field theory

E. H. PORTER. Client-centered theory

ROY SCHAFER. Psychoanalytic theory

Discussants: SAMUEL J. BECK, MAX L. HUTT

**Case Conference Workshops****Workshop A: Transvestitism in an Autistic Child**

SOLOMON MACHOVER, chairman

Presentation: ROCHELLE M. WEXLER; Discussant: KAREN MACHOVER

**Workshop B: Repeated Psychological Tests on an Obsessive-Compulsive Adult Male in Psychotherapy**

MORTIMER M. MEYER, chairman

Presentation: NORMAN L. FARBEROW; Discussant: SAMUEL B. KUTASH

**Workshop C: Demonstration of Diagnostic and Therapeutic Planning at the Psychological Clinic of a University**

FREDERICK WYATT, chairman

Presentation: ZANWIL SPERBER, PEARL AXELROD, JUSTIN WEISS, AND STANLEY SCHNEIDER; Discussant: W. MASON MATHEWS

**Workshop D: Patterns of Action in a Case of Obesity**

ARTHUR WEIDER, chairman

Presentation: ALBERT J. STUNKARD AND NATHAN STOCKHAMER; Discussant: HILDE BRUCH

**Workshop E: Frigidity in a Young Female Adult**

THEODORA M. ABEL, chairman

Presentation: MARVIN L. ARONSON AND GERTRUDE BONDEL; Discussant: ZYGMUNT PIOTROWSKI

**INTERNATIONAL COUNCIL OF WOMEN PSYCHOLOGISTS**

(Program submitted to APA Program Committee)

**Invited Address**

EDITH LORD, chairman

MADAME VIJAYA LAKSHMI PANDIT. Man's Right to Knowledge and the Free Use Thereof

**International Meeting**

HARRIET O'SHEA, chairman

Topics: The role of psychology in many countries  
The role of educated women in many countries

Speakers: Foreign women delegates to the United Nations

**PSI CHI****Anniversary Program**

Speaker: EDWIN B. NEWMAN

## MEMBERSHIP RULES IN THE AMERICAN PSYCHOLOGICAL ASSOCIATION

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There are three classes of membership in the American Psychological Association: Associate, Fellow, and Life Member.

### *Associates*

The largest class of membership is *Associate*. In order to qualify as an Associate an applicant must meet one of three sets of requirements:

1. He must have a doctor's degree based in part upon a psychological dissertation and conferred by a graduate school of recognized standing; *or*
2. He must have completed two years of graduate work in psychology at a recognized graduate school and be devoting full time to work or graduate study that is primarily psychological in character; *or*
3. He must have completed one year of graduate study plus one year of professional work in psychology and be devoting full time to work or graduate study that is primarily psychological in character.

Distinguished persons in related sciences, education, or other fields outside of psychology sometimes apply for membership in the Association because of their interest in allied research problems. When the Council of Representatives considers it in the interests of the Association to elect such distinguished persons, the requirements stated above may be waived.

Annual dues for Associates are \$17.50, except that for his first five years of membership, an Associate pays \$12.50 a year.

Applicants must have their applications complete by August 1. New Associates are elected in the fall and their membership is dated as of the next year. Journals due Associates begin with the January issues; they receive the *American Psychologist*, the *Psychological Abstracts*, the *Psychological Bulletin*, and the *Directory*.

### *Fellows*

Properly qualified Associate members may, upon nomination by one of the Divisions and election by the Council of Representatives, become *Fellows* of the American Psychological Association. Fellows must previously have been Associates. They must have a doctor's degree and at least five years of acceptable professional experience beyond that degree. They must be primarily engaged in the advancement of psychology as a science and a profession.

Annual dues for Fellows are \$17.50. Fellows receive the same journals as Associates.

In the American Psychological Association, no one is made a Fellow except at his own request.

### *Life Members*

*Life Membership* is open to members who have reached the age of 65 and who have been members for twenty years. They are exempt from dues, and receive the *American Psychologist* and the *Directory*.

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**Mathematical Aspects of Information Theory**, BROCKWAY MCMILLAN, *research mathematician, Bell Telephone Laboratories*

**Information Theory and the Discrimination of Sequences in Stimulus Events**, DAVID A. GRANT, *professor of psychology and chairman of the department, University of Wisconsin*

**The Influence of Response Coding on Performance in Motor Tasks**, PAUL M. FITTS, *professor of psychology and director, Aviation Psychology Laboratory, Ohio State University*

**Some Perceptual Problems from the Point of View of Information Theory**, FREDERICK C. FRICK, *chief, communications research, Human Resources Laboratories, Bolling Air Force Base, Air Research and Development Command USAF*

**Information in the Head**, WARREN S. McCULLOCH, *Research Laboratory of Electronics, Massachusetts Institute of Technology*

**Information Theory and the Study of Speech**, GEORGE A. MILLER, *associate professor of psychology, Massachusetts Institute of Technology*

**Information Theory and Clinical Medicine (Psychiatry)**, HENRY W. BROSIN, *director, Psychiatric Institute and Clinic, and chairman, department of psychiatry, School of Medicine, University of Pittsburgh*

\* \* \* \* \*

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## University of Pittsburgh Press

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# PSYCHOMOTOR ASPECTS OF MENTAL DISEASES

BY H. E. KING

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## American Psychological Association and National Science Foundation

### National Register of Scientific and Technical Personnel

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If you have not yet completed and returned your questionnaire for the National Register of Psychologists, the Central Office would appreciate your doing so. To those of you who have already returned the questionnaire (about 65 per cent of the APA membership), our sincere thanks.



# PERSONALITY DYNAMICS

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*Loyola University, Chicago*

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Raymond A. Bauer  
*Harvard University*

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